The Journal
of the
Mysore Agricultural
and
Experimental Union.

VOL. IV. 1922. No. 4.

The Fifth Annual Meeting of the Mysore Agricultural and Experimental Union.*

Welcome Speech by the President.

MR. HUMZA HUSSAIN & GENTLEMEN,

It gives me great pleasure to welcome you to the Fifth Annual Meeting of the Mysore Agricultural and Experimental Union.

Our Union is an organization unique in India. In addition to the usual propagandist work which agricultural organizations are supposed to carry out, it has as one of its chief duties the testing and reporting upon improvements which, as a result of experiments on our farms and in our laboratories, the Agricultural Department recommends for adoption in the State. The scope for work in this direction is unlimited. There is probably no agricultural improvement which can be safely recommended for general introduction in the State without its first undergoing thorough trial under our varying conditions of soil and climate. This work of testing improvements accurately is one involving a great deal of patience and self-sacrifice and it is perhaps not surprising that there are still many of our members who have not taken up any definite work along these lines. There are others who, I regret to say, having started such testing work have not carried it out to its conclusion so that accurate figures are not available to tell us of the results. I wish again to insist

* Welcome speech by Dr. Leslie C. Coleman, M.A., PH.D., President of the Union, at the opening meeting on 9th November 1922.

most emphatically upon the supreme necessity of this kind of work. I am firmly convinced that in no other way can you so further the rapid development of Agriculture in Mysore.

I do not make the above remarks in any fault-finding spirit and I wish to bear full testimony to the very valuable work that many of our members are doing in this direction. Recent tours have shown me how carefully this work is being carried out by many and how valuable the results are certain to be. But the volume of this work should be greatly increased if the Union is to do its full duty to the State's primary industry.

It must be gratifying to us all that our august ruler His Highness the Maharaja of Mysore has shown his interest in and appreciation of the work the Union is doing by the signal honor he has recently conferred on two of our members. I am sure you will join with me in offering our sincere congratulations to Messrs. S. Lakshman Reddi and H. Srinivasa Rao on the honour His Highness the Maharaja has conferred upon them. These gentlemen are two of our most active members and I wish to express my own thanks to them for the pains-taking manner in which they have co-operated with the Department not only in the way of carrying out tests of improvements but also in popularizing those improvements in their neighbourhood.

The work of these two gentlemen furnishes us with striking examples of what agriculturists in the State can do to further the development of agriculture by testing improvements recommended by the Department and by adopting and popularizing such improvements as are found suitable to their particular part of the country. Mr. Lakshman Reddi has over a series of years carefully tested sugarcane and ragi varieties introduced by the Department. He has now an area of between two and three acres of one of the best of these varieties H. M. 544, from which he expects to get a crop of 50 tons of cane to the acre. This represents a jaggery yield of between 450 and 500 maunds per acre or over 100 maunds in excess of what has heretofore been considered as a very good crop in this area, an area which is probably the most highly productive sugarcane area in the State. This yield has been made possible by the use of the new variety, and by the methods of the manuring and cultivation recommended by the department as a result of careful experiment. Mr. Lakshman Reddi's work has already resulted in an appreciable improvement in cane

cultivation in the neighbourhood while his estate in the future is likely to be our chief centre of distribution for improved varieties of cane in the Goribidnur Taluk. I have touched upon only one phase of Mr. Lakshman Reddi's activity. He has in addition been a leader in the introduction of improved implements while he has recently taken up work in co-operation with the Live-stock Section on the maintenance of an improved flock of sheep. Mr. H. Srinivasa Rao has been from the first one of our most active members. He is a man who after an active life in one of the most strenuous Departments of Government service has gone back to the land and is in personal management of his large Estate in Malur Taluk. He has been most painstaking in testing our improved plough and has furnished us with a most valuable report and opinion upon it. He has been instrumental in the popularization of the use of ammonium sulphate for sugarcane while his investigations of a serious pest of the cocoanut have been very valuable. He has also carried on regular tests on both ragi and groundnut varieties. Whenever Mr. Srinivasa Rao takes up a piece of work I am always perfectly sure that he will carry it out in a thorough and scientific manner, and I look upon him as a sure and steady support to the structure of improved agriculture which we are trying to erect in the State.

I wish to point out that these gentlemen are but two of many hundreds of our leading agriculturists who are actively engaged in every District and Taluk I might almost say in every hobli of the State. They are not among those who talk glibly of agricultural improvement in public meetings but at the same time confine their practical observation of agricultural conditions in the State to a complacent survey of their fields at the time of harvest or of the golden grain on the harvest floor where they supervise with care the apportionment of their share of produce which has been wrung from the soil by the sweat and toil of others. It is not on such men as these but on men like Messrs. Lakshman Reddi and Srinivasa Rao that Mysore will have to depend for her agricultural regeneration.

We have also to welcome back to us Dr. M. K. Venkata Rao who has returned to us after three years' distinguished study in England and America. Dr. Venkata Rao is, I believe, the proud possessor of more academic letters after his name than any other man in Mysore. He is too modest a man to display his academic honours in a visiting

card but were he to do so he would require one several times the ordinary size. I wish on your behalf and on my own to welcome Dr. Venkata Rao and to express our hope that he will be able to put in many years of distinguished service in the State.

I shall not attempt here to detail to you the various lines of work which our members are taking up in co-operation with the Agricultural Department. They extend all the way from the testing of new varieties of crops on the one hand to the improvement of our sheep industry on the other. I should, however, like to draw attention to one line of work which is worthy of serious consideration on the part of our members.

We have recently passed through a very anxious time when it looked as if our dry and wet crops in large sections of the State would be an almost total failure. The rains during the past month have altered the situation greatly so that now we may look forward to average crops over most of our area. One of the most serious aspects in connection with the shortage of the South-west monsoon in our Maidan tracts has been the disappearance of fodder supplies resulting in the reduction of our cattle to a state of starvation. I need hardly emphasize here the paramount importance of cattle to the agriculturists of this State and the very serious results that would follow the disappearance of any large number of our draught bullocks. It is necessary, I think, therefore, to turn our attention to the question of fodder supply in a way that we have not done in the past.

There are very few crops in the State grown purely as fodder. Certain of the *akkadi* crops, such as *jola*, are used in this way but they occupy an insignificant proportion of our total cropped area. Where ragi fails, as it has in some of our taluks this year, it is customary to put in horse-gram which yields comparatively little fodder. It has for some years been a question in my mind whether it would not be better in such instances to sow considerable areas of even our red soils with *hingar jola*. This crop is certain to give a supply of fodder far in excess of that obtained from horse-gram, while with favourable rains in the North-east monsoon it is likely to give a fair crop of grain as well. I need hardly point out here that in Chitaldrug District where hingar jola is commonly grown it is by no means restricted to the black cotton soils.

Another crop which appears to hold out considerable promise as a quick-growing fodder crop on our dry lands is sun-flower. Experience both on the Hebbal Farm and on the Palace Dairy Farm at Rayankere goes to show that this crop withstands drought much better than jola while the cattle eat it with relish. It seems quite possible that it may prove very useful as a subsidiary fodder crop in years when ragi is a comparative failure.

The unfavourable conditions as regards fodder this year have led the Department to advocate the growing of hingar jola on a large scale in areas where it is not ordinarily now grown. This is especially the case in Maddagiri Taluk where the fodder famine has been particularly acute. 200 pallas of seed have been purchased and most of this has already been distributed. While much of this will be sown, as is customary, under tanks where the moisture supply is assured a certain amount is being sown on dry lands as well. Small quantities of sunflower seed have also been distributed for trial sowings on dry land. The general results of this work will be discussed in our Journal as soon as they are available. I would suggest that trials of this kind should be carried out by our members in all areas where danger of a fodder famine frequently occurs. The results of the accumulated experience resulting from such trials would, I am sure, be of the greatest benefit to the State as it would put us in a position to know just what we should do in years when the South-west monsoon is a comparative failure. Our Agricultural Department should be something more than a fair weather department able to help our agriculturists in years of favourable seasonal conditions. It should be able to assist them in years of trouble as well and I can think of few more useful lines of work for members of this Union than assisting the Department in the trials of subsidiary crops to increase our stocks of fodder.

The Dewan in his able Dasara Address drew our attention to the great need which exists for increase in the production of food grains in the State. While much can be done and is being done in the way of increasing crop production by the introduction of improved varieties and better methods of manuring and cultivation, improvement on these lines is bound to be gradual. A really rapid increase of production will be possible only if we are able to increase materially the area under cultivation. That an agricultural family in Mysore

can on the average cultivate no more than 6 or 7 acres of land indicates, I think you will admit, a pretty low standard of efficiency.

There can be no question of general land hunger in Mysore for as I have pointed out in a recent article over 1,000,000 acres of our occupied land lies fallow every year. The frequent requests I receive for advice as to the possibility of introducing tractor cultivation point in the same direction.

I have estimated that our agricultural position permits of an increase of 50% in our cultivated area but am convinced that such an increase can take place only through the introduction of more efficient implements. We have up to the present touched but the fringe of the agricultural implement question in Mysore and I think we have made about as much progress here as has been made in any part of India. As I have again and again insisted the implement problem can be solved only by the provision of an adequate staff to work in the adaptation of improved implements to our conditions, by the thorough testing of such implements and by the creation of facilities for the manufacture of such implements in India. One of our most important subjects for discussion at the present meeting is that of the new plough which has been designed by us and which the members of our Union have been engaged in testing during the past two years. I wish to bear testimony here to the very important work our members have done in this connection. Without their co-operation I am sure it would have taken the Department many years to make the progress we have been able to make during the past two years. A good deal of impatience has been expressed in many quarters that we have not been able to produce this implement already on a large scale. Our critics must surely be thinking that we possess some magic wand for the purpose. I may tell you, however, that I am at present in touch with four firms, two of them having factories in India who are preparing for me estimates for large scale production. I think I may, without any serious break of confidence, say that it seems quite possible that our new iron works at Bhadravati may help us in the solution of the problem. One great difficulty is of course to produce a really efficient implement which will at the same time be priced so low as to be within reach of a large number of our agriculturists. Another is the provision of capital to finance the introduction of this and other implements on a large scale. Our greatest handicap of all is, as I

have already pointed out, the lack of an adequate staff for carrying on the work of implement improvement.

My remarks upto the present have been addressed primarily to members of the Union and to practical agriculturists in general. There are with us to-day, however, some who while they may have a deep interest in agriculture,—and who in Mysore has not ?—yet are unable to take any practical part in the development of the State's greatest industry. In what way can they be of use in this work ? I take it that it is their duty to make their interest in agricultural development an intelligent one. There is still, I fear, a tendency for many of us to look upon agriculture as a subject upon which any and every one is capable of expressing a valuable opinion which he is apparently able to evolve from his inner consciousness without undergoing the painful process of seriously studying the question. Surely it is time that all of us abandoned such an idea. How are you, gentlemen, going to equip yourselves with the information which will enable you to discuss agricultural questions at least not unintelligently ? I can think of no better way than by your subscribing for and carefully reading the Journal which the Union publishes. The Journal will, I believe, bear favourable comparison with any agricultural journal in India. I can speak with freedom on the subject as I have nothing to do with its management and am only an occasional contributor to it. It has an exceptionally able editorial staff and the articles it contains have a definite practical bearing on the agricultural problems of this State. Take my advice, gentlemen. Read, mark and inwardly digest its contents and when you are next tempted to dilate upon the vast agricultural problems of the State and just how you would usher in the agricultural millennium, you will at least have some solid basis of reliable information to stand upon.

Gentlemen, I might detain you much longer discussing a hundred and one fascinating and important subjects connected with our chief source of prosperity but our programme is a long one. I shall close by expressing our gratitude to you, Sir, in honoring us with your presence to-day and by trusting that our discussions here will not be a mere uttering of empty words but will be such as to spur us on to greater activity in connection with the advancement of Agriculture in the State.

The Secretary then presented the Annual Report. Discussion on the report being postponed to the Business Meeting, Mr. Mir Humza Hussain, B.A., B.L., Member of Council, delivered the following address :—

Chairman's Speech.

Dr. Coleman, Members of the Mysore Agricultural and Experimental Union, and Gentlemen,

I feel myself honoured by having been asked to preside over the Annual Conference of the Mysore Agricultural and Experimental Union which counts amongst its members the leading agriculturists of the State. I have readily and cheerfully responded to the call not because I happen to be for the present the President of the Board of Agriculture or Member of Council in charge of the Agricultural portfolio but from a sense of duty as a citizen of the State whose prosperity and well-being depends entirely upon the flourishing condition of its agriculture. No man who has the interests of his country at heart can be indifferent to the development and improvement of its agriculture, for the decadence of that industry means nothing but disaster and its improvement means increasing prosperity of the country. In England, which as you all know is an industrial country, the present agricultural depression which is partly due to the drought of 1921 has been described by a writer in the columns of the *Times* 'as a menace to the stability of the nation'. What should be said then of a State which passes through a season of drought once in three years and of its farmers who have no reserves either in cash or grain to tide over times of distress.

But unfortunately we have been indifferent in the past towards this industry which is the mainstay of our existence. In the term 'we' I include both the people and the Government. The people have been indifferent on account of their conservative habits and lack of knowledge and enlightenment on the subject and the Government on account of the inherited notions of polity that the function of the State lay chiefly in the maintenance of law and order and protection of the life and property of its subjects.

Attention was no doubt being paid by the Government to the extension of irrigation by the construction of channels and tanks but not to the scientific side of agriculture and even as regards the former the works were undertaken not so much with a view to the

development of the resources of the people as to secure a profitable investment for the surplus balances in the Treasuries of the State. A change has happily come now in our views as regards the duties of the Government. The material and moral development of the people is considered to be as much an essential duty of the State as the exercise of its police function.

It was in the time of the late Sir Seshadri Iyer, I think,that attention was first paid to the scientific side of our agriculture. That 'remarkable' statesman saw the need of agricultural development and appointed an Agricultural Chemist to investigate the agricultural problems of the State and assist the ryot in the development of cultivation. In the time of Mr. A. Rangaswami Iyengar, Revenue Commissioner, the Revenue Department took up the work of agricultural development. Under his guidance agricultural associations were started, improved ploughs were purchased and offered for sale to the ryots and some varieties of fast-growing paddy were introduced, but the interest created by him did not last long and the attempt failed for want of sustained effort and expert advice. It was, I believe, in the time of that distinguished statesman Sir M. Visvesvaraya that the Department was organized on its present basis and the present President of your Union became its first Director. Dr. Coleman as you all know combines in himself high scientific knowledge with the practical insight of an administrator and under his able guidance the Department has achieved a success and a name in no way inferior to that of any other Agricultural Department in British India. If Pusa and Punjab have evolved new varieties of wheat and cotton suited to local conditions our Department has evolved new varieties of ragi and sugarcane which are becoming every day popular and which have improved quality and increased considerably the out-put of those crops. I would like to invite your attention to what I stated in my closing remarks at the last Session of the Economic Conference, in reviewing the work of the Department. I said that "Stress was laid by many a speaker upon the necessity of effecting agricultural improvements. This is the aim which the Agricultural Board and the Department have steadily kept in view. To the Department belongs the credit of having popularized improved kinds of ploughs and up till now about 8,000 have been sold to the ryots. From the report of the Director of Agriculture it will be seen that improvements have

been effected in all branches of agricultural work as a result of patient toil on the part of the officers engaged in research work. The quality and nature of manure used ordinarily by our ryots have been examined and improved methods of manuring suggested for the needs of different kinds of crops, but the notable result achieved is in the direction of sugarcane cultivation. Ammonium sulphate has been found to be a very useful and profitable manure for sugarcane in Mysore and arrangements are in course of progress for the supply of the same at cheap rates. The experiments made in regard to developing a better variety of sugarcane are well known to you. They have resulted in the production of a variety of sugarcane which yields 25% more than local varieties and produces quite as good a jaggery. An improved type of plough suited to Mysore conditions has been designed and fully tested and arrangements are in course of progress to manufacture a large number of them and supply them to ryots. The success achieved by the Department in producing a strain of ragi which has considerably increased production has already been brought to the notice of the public. There are other useful investigations too numerous to mention, upon which the Department is engaged and when they are completed, they will be the means of adding considerably to the wealth of the ryot population. As a result of these operations of the Department, it is estimated that the wealth of the ryot population has increased by about 32 lakhs. This is an achievement of which any Department can be proud."

These observations of mine were based upon the reports of the Department and the progress of its work which I had watched as a Member of the Economic Conference from its very inception. But I had no opportunity to test the work personally until my recent tour in some parts of the Bangalore District. I am happy to state that my impressions were fully confirmed by what I saw in the villages and that the summary of the work given by me is by no means exaggerated. It is stated as regards Agricultural Development that 'in India the first necessity is to create an atmosphere of confidence and co-operation", and that I found in abundance in the relations existing between the ryots and the officers of the Agricultural Department. It is a wholesome rule that Dr. Coleman has laid down for the guidance of his department, *viz.*, not to recommend any improvement

whether in the methods of cultivation or in the selection of seeds or the adoption of new varieties of crops, unless it has been tested and found to be satisfactory under different climatic conditions and different types of soil. Our ryots cannot afford to make experiments and lose money and when once their confidence is shaken it is exceedingly difficult to regain it.

I had an opportunity of visiting the Hebbal Farm and the Agricultural School and found that the Department was engaged in a number of experiments for evolving new varieties of ground-nut, Dal, castor-oil and other crops commonly grown in our State and improving further the strains of ragi and sugarcane already mentioned. Experiments were being made in fruit culture and the cultivation of manurial crops. I was glad to find that the cultivation of grass—a commodity considered to be not of much value in ordinary eyes, was not overlooked as beneath the notice of the Department. The problem of finding sufficient pasture for our cattle will become, in course of time if not immediately, one of the difficult problems to solve and it is indeed gratifying that the Department has taken up the question in right earnest.

The Agricultural School is run on very sound lines and the peculiar feature of that institution is that it combines cultural education with vocational training in a remarkable degree. Most of the students belong to the families of agriculturists and when they go out of the school they are likely to give a great impetus to scientific agriculture in the State. The school serves the function of a Central Institute for the study of advanced agriculture though it is not known by the dignified appellation of a college and to it should be affiliated, I think, Vernacular Agricultural Schools of the Chikkanahalli school type for which there is a great demand in the country.

Closely connected with the question of agriculture is the question of cattle breeding and dairy farming to which Mr. Davison is paying particular attention. It will take some time before he succeeds in evolving a strain of cattle which will be useful both for milking and draught purposes. But his experiments are already bearing fruit in sheep breeding.

That in spite of the heavy expenditure involved in experiments, the Department is conducted on the most economical lines is evident from the fact that this is the only Department that has come out

unscathed from the ordeal of the vigilant scrutiny of the Finance Committee which sat some time ago to examine the finances of the State.

Creditable as the results have been there remains much more to be done by the Department. As remarked by the Dewan in his illuminating address to the Representative Assembly at the last Dasara Session, 'the State does not produce enough food for its own requirements and is, even in normal years, dependent on imports from outside'. It is a disquieting feature to learn that ' the net cropped area declined from 6,047,455 acres in 1911-12 to 5,954,930 acres in 1920-21 and the extent of land under fallows increased from 149,866 to 190,799 acres. Government have been doing everything in their power to bring more of the assessed and unassessed waste under occupation and with that view have recently appointed a Special Officer for the speedy disposal of lands under Darkhasts. But the causes of the decline under the area cropped in spite of the phenomenal rise in the prices of food grains are to be carefully investigated by the Department. Is it due to want of labour or finance or to a desire on the part of capitalists to acquire and retain more land for speculative purposes than they can profitably cultivate ?

The area cultivated with food crops was 4,341,190 acres and this if it gives the outturn per acre which the agriculturists in Japan or America get, we ought to be able to produce sufficient amount of foodstuffs so as to make the country self-supporting and independent of foreign imports. To raise the yield per acre the obvious remedy that suggests itself is to have recourse to intensive cultivation. But I am deterred from making that suggestion by the remarks made by a Professor of the Institute of Agricultural Economics at Oxford University with regard to the conditions prevailing in England that "there were people who thought that they could meet low prices and bad times by increasing out-put. but this was true only if they could get the extra crop without increasing the cost entailed by the smaller crop. " To talk about increased production at present" he observes "is really an economic absurdity". It is a point requiring careful investigation on the part of the Department whether on account of the rise in the wages of agricultural labour and increased cost of chemicals even a discriminate use of artificial fertilizers in our State may not produce the result apprehended by the Professor.

Closely connected with the question of food production is the

increased use of improved ploughs. It is no doubt a gratifying feature that 8,000 ploughs chiefly of the American pattern have been up till now purchased by the ryots. These can serve according to the calculation of Dr. Coleman, an area of 80,000 acres, *i.e.*, only a fraction of the land under cultivation.

A very large supply of ploughs is needed, but as they are imported from abroad their cost is necessarily high and beyond the means of ordinary ryots. The Director thinks that a local factory is necessary to maintain a continued supply of these ploughs to the ryots. This is no doubt a laudable object, but the use of the ploughs will not become general unless the village smith is able to understand the mechanism and repair the broken parts at once. I hope both the officers of the Department and members of this Union will use all their efforts in improving the efficiency of local artisans.

Another point to which I would like to draw the attention of the Department is the usefulness of soil surveys. In some districts in Madras this is being attempted. The Department must be able to say to the ryot the kind and composition of the manure he should use for any particular plot of the land under his occupation and the necessity for such a survey becomes the greater as in the Mysore plateau the soil varies from block to block and from field to field. The scientific survey of the soil must in course of time replace the empirical methods of classification adopted by the Revenue Survey Department.

The Malnad demands special attention at the hands of the Department. The agricultural problems of the Malnad are in many respects different from those of the Maidan. No doubt an effective remedy against *Kole Roga* of the arecanut has been discovered and is much in demand but very little has been done towards the improvement of the crops peculiar to the Malnad. A new strain of coffee is to be evolved which will resist the attacks of the green bug and the new disease known as Dieback which is reported to have appeared in some parts of the Kadur District. Attention has to be paid to cardamom and pepper and the improvement of the arecanut tree is to be aimed at in order that it may give an increased yield.

The causes that retard the progress of agriculture in our State are generally the system of *guthige* tenure or absentee landlordism, the scattered holdings and the fragmentation of estates and the hopeless indebtedness of the ryot. As regards absentee landlordism, it gives

no impetus to the landlord or the tenant to develop his land. But with the development of the agricultural school a class of gentlemen-farmers will, it is hoped, spring up who will live upon their farms and pay personal attention to the cultivation of their lands. To effect consolidation of holdings perhaps legislation on the model of the English Acts on the subject may be necessary but a lot of propagandistic work is required before the State can undertake legislation in the matter. It behoves the members of this Union to educate their brethren in this respect and to bring about consolidation by consent of parties interested.

As the personal law of both Hindus and Mahomedans now stands, it is not possible to prevent fragmentation of estates. The Joint Hindu Family system has no doubt the effect of retarding the disintegration but the power of alienation of a member of a Joint Hindu Family has so far been extended by judicial decisions that the Joint Family system can no longer be expected to produce the desired result. The evil has to be recognized and faced and the Department must suit its methods to these conditions.

I now come to the question of agricultural indebtedness. It is said that 'an agriculturist lives upon his losses'. This is true in places where the creditor is humane, sympathizes with the misfortunes of his debtors and gives them help in times of distress. But with our Marwadi money lenders with high rates of interest and with Court decrees and sales in case of default, the losses instead of giving the ryot a new lease of life actually result in his ruin. When I was Subordinate Judge at Chickmagalur, I found that many a coffee planter was about to be ruined on account of the inexorable demands of the Marwadi money lenders. The remedy that I adopted was to order payment of the decree by easy instalments. The result was that the instalments were regularly paid, the debts were discharged and the estates were saved. No doubt a number of Co-operative Societies of the credit type have been established but they have not gone far to relieve the ryot of his indebtedness. As remarked by a former Dewan of Mysore all that has been done till now "amounts to a scratching of the surface". What the present rural credit societies do is to borrow money from the Central Banks and distribute it amongst the share-holders. But they do not advance to the ryot money for the purchase of seed, for the cutting and stacking of his crop or for

the purchase of cattle. What we want now are societies for the distribution of seed, for the supply of ploughs and manures and the Agricultural Department should in this respect work in close co-operation with the Co-operative Department.

A suggestion has already been made to the Director that the Co-operative Societies might be used for the sale of ploughs and manures and that the societies may be allowed a small discount on their sales. The Director has promised to discuss the matter with the Registrar of Co-operative Societies, and I hope that by their joint deliberations they will be able to evolve a scheme which will make the co-operative societies distributing centres of agricultural implements seed and manures, and relieve the departmental officers of much of the office work so that they may devote more time and attention to field work.

Another point of vital importance to the prosperity and well-being of a ryot is the question of subsidiary occupation. Sericulture is one of the important industries he is engaged in at present in some parts of the State in supplementing his slender income. I am glad to state that, under the able guidance of the present Superintendent of Sericulture, the industry has made a satisfactory progress and his recent move in setting up a filature on up-to-date lines has given a further impetus to the industry and many such filatures are likely to be established by private persons in the immediate future. But Sericulture cannot be introduced in places where climatic and other conditions are not favourable. Various attempts have been made in the past to start suitable cottage industries but with no success. Fruit culture, I think, must be taken as a subsidiary occupation by the ryot and the officers of the Agricultural Department can do a lot in inducing the ryots to plant fruit bearing trees in their *hittals* and back yards. In this connection I am glad to state that the Director has agreed to give a course of training in horticulture to the Agricultural Inspectors. The problem of subsidiary occupation for the ryot can be better tackled by the Agricultural Department which is in close touch with the ryot than by any other department and I think that if the Director and the Members of this Union take up this subject, there is every prospect of its being successfully solved.

Lastly, I think that for the progress of agriculture a network

of agricultural societies on the model of the Japanese Societies should be established throughout the State. The old agricultural associations established under the patronage of the Revenue Department have become defunct, as I stated in the early part of my address, for want of organization, co-operative effort and scientific advice. The Union of which you are all members, it seems to me, has been established on sound lines and has the germ of permanency in it. Here, the non-official members who are chiefly agriculturists come in close contact with the officers of the Department, see for themselves what the officers are doing, test for themselves the results of their labours, imbibe fresh ideas from them and propagate them in their villages. They form so to speak the advance guards of the Department to fight the prejudices of ryots and to prepare the way for its subsequent operations. The increase in the membership of the Union is a healthy sign of the awakening of the agriculturists to the advantages of the scientific method of cultivation. If a number of such Unions be established, all affiliated to the present institution, I am sure the agricultural development of the country will proceed with an accelerated pace and increase the prosperity of the State by leaps and bounds.

I am afraid I have detained you long. Agriculture is such a fascinating subject that when one begins to speak one does not know where to stop. There are a number of useful subjects on the Agenda which you are going to discuss in this Session and I do not propose to take up any more of your time. I wish you godspeed in your work and when you return home I dare say you will carry with you pleasant recollections of your stay here especially of your visit to the Hebbal Farm. When visiting the Farm, I hope you will realize the necessity for a 'home' for the members and I am sure that the appeal of the Secretary for a building for this purpose will not have been made in vain.

Director of the Canadian Government Farms says that dairy farmers can increase the yearly milk production per cow by 10 per cent. by providing adequate protection against feed shortage during the summer. Farmers should plan to have silage or some special crop for the cows during the seasons when ordinary pastures are parched and bare.—*Live-stock Journal.*

The Hebbal Plough.*

BY

H. Srinivasa Rao,

Retired Deputy Conservator of Forests.

One of the impediments in the way of rapid improvement of agriculture is that this pursuit is mostly confined to the illiterate and the backward classes, who do not budge an inch beyond the beaten path of their ancestors. The intelligent and higher classes of people though owners of large landed estates are not generally direct cultivators. They avoid agricultural pursuit owing chiefly to the constant manual labour which it involves. Being brought up in easy ways of life from infancy they are averse to and incapable of sustained labour and even when they want to pursue agriculture they employ labourers, or seek for labour-saving machines and implements. The most tedious task in agriculture is the ploughing or preparation of the soil. This operation with the primitive plough is the most taxing of all. The work with the country plough requires several times the time the improved plough takes, and with all this sacrifice of time the work turned out is inferior to that of the improved implement. Owing to the advantages which the improved ploughs possess over the indigenous ores their employment is rapidly spreading, and people seek to find out which kind of improved plough is most useful. From experience gained till now about improved ploughs the Kolar Mission plough is found to be the most advantageous generally for all dry fields. As the main parts of this plough are made in America their value and their supply depends on the far-off American markets and conditions of transport, and their value has steadily risen from Rs. 16 some years ago to Rs. 28 which is almost prohibitive and is not within reach of men of ordinary means. Besides this, the frequent replacing of shares whose cost has also risen from Rs. 2-10-0 to Rs. 4-2-0 is a discouraging feature as regards this plough.

With a view to overcoming this difficulty attempts are being made for some time at Hebbal Farm and elsewhere to produce a local implement equal to Kolar Mission plough in work. With this view the Agricultural Department made an improved pattern of the Kolar Mission plough at the farm workshop with a bar point. One of them was sent to me for trial and report in 1920.

* Speech with which the subject was opened for discussion at the V Annual Meeting on 9—11—22.

The plough though good in design was not quite satisfactory in certain points owing to the defects in making, common to hand-made implements. The plough was duly tested and reported on describing its merits and demerits. After this a second consignment of this plough was made for the Agricultural Department at the Mysore Railway Workshop at Bangalore, with a much higher degree of finish. One of these was again sent to me for trial in 1921. It was tested on different types of soils and its work was found very satisfactory. The test was of a comparative nature as this plough and the Kolar Mission plough were both put to work side by side for an equal length of time and on the same kind of soil. The results have been already reported on. The trials showed clearly that the Hebbal plough is superior to the Kolar Mission plough in point of work, but its draught could not be tested for want of a dynamometer.

At the last year's meeting I was asked to continue its trial this year also. Accordingly I put the Hebbal plough for daily work on the farm instead of using it occasionally for comparative tests. On one occasion I lent it to a big ryot for preparing his land for potato planting. The ryot told me that it worked very satisfactorily. On the whole the plough has worked (taking the first and the subsequently ploughed plots as separate areas) about 20 acres and the length of the bar point has been reduced to 1′ 3″. During this whole time there was no breakage of any kind except that of a single bolt which was speedily replaced. In my opinion this plough may throw the Kolar Mission plough to the back ground but the demand for it depends on its price.

Manuring the Sugarcane.*

BY

N. Krishna Iyengar, B. A.,

Inamdar, Uragahally Estate.

As I have been asked only to open the discussion on cane manuring I shall not take up your valuable time by making a speech, but shall content myself by offering a few preliminary remarks.

First of all I wish to inform you that I am not conversant with the methods of manuring cane obtaining all over the State. I shall briefly describe the practice obtaining in and around my Estate.

* Speech with which the subject was opened for discussion at the V Annual Meeting on 10—11—22.

The country round my farm is hilly and the soil light and stony. Except in the valleys it is not very deep. Irrigation facilities are limited and not assured, the rainfall being light and fitful.

Although by nature the country is not fitted for cane small patches of excellent canes are raised by the industrious farmers.

As a rule the land selected is naturally well drained and of a loamy nature. About 100 cart-loads of tank silt per acre, along with some dry hongey (*Pongamia glabra*) leaves, are ploughed in long before planting. The cane sets are planted in shallow pits in rows 3 feet apart and supplied with a few handfuls of cattle manure. These are hand-watered in the beginning, the manure on top of the sets serving as a mulch, besides supplying the required plant food. At "lay-by" a small quantity of earth from manure pits along with well-rotten hongey flowers or leaves is applied. Oil cake as manure was unknown in these parts till very recently.

Gingelly, chillies, black and green gram are alternately grown on cane lands. Paddy is never grown in rotation with sugarcane. Ragi is now taking the place of the above mentioned crops.

While I was growing heavy crops on my farm on the lines above described, I was advised by my uncle,—an extensive cane grower near Bangalore, then considered an expert in cane matters,—not to use oil cake for my fields, the reason adduced being that the land would get used to it and would fail to produce good crops if withheld. While I was considering this advice and collecting information on the point, Dr. Lehmann visited my farm and I was obliged to change my ideas; and under his able guidance I used cake with profit and increased the dose from ½ ton to 3 tons.

In the meantime the price of cake went up steadily and rose so high that applications of heavy doses were not possible even with the high price which jaggery fetched.

With a reduced dose, the land depleted of its plant food by heavy cropping, could not produce the usual crop. The cane being starved, disease put in its appearance, sapped its vitality and in 1920 wiped out 14 acres.

About this time the use of chemical manures with profit in Germany and other countries and also the promising results obtained on the Hebbal Farm by the use of sulphate of ammonia were brought to my notice by Dr. Narasimha Iyengar. The following year

these results were further confirmed on my own farm by crops raised on the plot scale. Thus encouraged I have manured my cane this year, as advised by Dr. Narasimha Iyengar, with 2 cwts. of sulphate of ammonia per acre four weeks after planting, supplemented with a dose of castor cake (1 ton 6 qrs. per acre) and 20 cart-loads of cattle manure at earthing-up time. The season was very disappointing as regards rainfall. As long as I had water in my tanks the crop promised to be a heavy one, the chief feature being its uniformity.

Dr. Narasimha Iyengar and myself further decided to use superphosphate with a view to counteract the retarding of maturity by use of sulphate, a 3 cwt. dose has been given, but I am inclined to think that we ought to look to the potash requirements also of the cane and so arrive at a well balanced ration.

With these preliminary remarks I wish to invite the members of this Conference to a discussion on the subject of manuring cane.

Improvement of Sheep.*

BY

W. Davison, B.S.A.,

Live stock Expert in Mysore.

In opening the discussion on the Improvement of Sheep, I am confronted by a necessity for brevity on account of the limited time at our disposal for this subject, and the fact that I have no desire to monopolize that time. It is my intention rather to indicate the main lines upon which improvement may be effected with the resources at present at our disposal, and what action is being taken by the Agricultural Department in this connection. The fact that a flock of sheep is a profitable institution requires, I think, no advertisement, the profit being obtained in various directions. Direct profit is obtained from wool, natural increase and manure, while a source of profit more difficult to estimate in cash terms is the value of sheep as a means of eradicating and keeping down weeds. I am strongly of the opinion, however, that the profit from sheep can be very much increased. Let me indicate, first of all, the actual amounts which, as far as I can learn, are usually obtainable from Mysore sheep as they are maintained at present.

* Speech with which the discussion on the subject was opened at the V Annual Meeting on the 10th November, 1922.

The average clip of wool per sheep is about 8 oz. per year, and that, if of good clean quality, and not of a mixed colour, will sell for Rs. 8 per maund. Short, dirty and coloured wool often will not fetch more than half of that price. Herein itself is a place where care and attention will be productive of better prices, and it is on this point that most of the work of the Department has been carried out.

As a result of crossing the local sheep with the merino, the yield of wool has been increased from 12 oz. of wool worth Rs. 8 a maund, (4½ as a lb.) to 2½ lbs. of wool worth 14 as. a lb. In other words, the value of the wool from a single individual is increased from As. 4½ to Rs. 1-12-0. This, however, cannot yet be realized by the general public, as the importation of rams involves rather more expense than the average private individual in Mysore can meet.

By the use of half-bred merino rams on the country sheep the yield is increased from 12 oz. to 1½ lbs., or doubled, though the increase in market value is not much over that of the good local wool, bringing about Rs. 10 per maund. Even at the same price, this means an increase of over 100%. A few of these rams have been distributed and some more will be ready for distribution in about 4 months, and all of them have already been applied for. This work will be continued in the future and holds out large possibilities for improving the present situation. But this does not end the matter. It is in fact at present only of a limited scope, the expansion being governed entirely by the number of hybrid rams available. On the other hand, the scope for improvement in other ways is great, and has no limitations. It has often been pointed out by me, at different times, that the value of wool depends largely upon its length, cleanliness and colour. I am speaking more of commercial value, than when wool is exchanged for kumblies, though even then such a statement holds good. That the length of the wool can be increased, and the yield not decreased, by clipping once instead of twice a year has been demonstrated by the experiments conducted during the past year, and the wool so produced was considered by a local weaver of some skill as a superior article. This is a practice possible to all, only requiring more strict attention to cleanliness. The tendency for lice to collect in the heavier fleece has been overcome by dipping every six months in a suitable solution. Where demonstrations were given during the past year in sheep

dipping, I think I may safely say that the treatment was not only successful, but the results were appreciable. I may say in passing that this year, when in Cawnpore. I was told by the Wool Expert at the Elgin Mills that he considered that dipped wool was of better quality and strength, and that they as a firm were anxious to encourage it.

Colour is a point which also carries importance and is easily explained. No wool but white wool is capable of being dyed, and. as such, is of a higher value. The maintenance of a white flock which will necessitate at first some rigid weeding out of coloured lambs unless a pure foundation herd be available. will prove to be a source of additional profit from the flock. But by a white wool I mean not "mostly white", with coloured flocks here and there but pure white which will not require picking over by the buyer. There is a definite source of increased profit in such action.

Increased breeding efficiency is probably the most important direction of general improvement. The average ewe does not lamb more than once in two years. I am convinced that a very great deal can be done in this direction by weeding out the poor breeders, keeping only active and vigorous rams, and adopting a definite system of weaning the lambs. The ewes will not breed while the lambs are suckling, and often one can see a lamb suckling a ewe smaller than itself. I have tried this year, as far as possible, to have all the lambs born at this season. This will make it an easy matter to wean off all the lambs and turn them as a separate flock at the end of six months, when they are strong enough to look after themselves and after which the ewes will commence to breed.

These, briefly, are points I would like to bring to your attention for the purposes of discussion. However, I cannot leave the subject with you without mentioning an organization which has recently been formed in the Kolar District, for the purpose of improved breeding of sheep. This Association, which has now over thirty members, has been formed entirely of men who keep and raise sheep, with a view to facilitate dipping and clipping operations, exchange and sale of good rams and the sale of wool. All members have undertaken to maintain white flocks. and are in close touch with the Agricultural Department, which is able to give help from time to time. It is my earnest hope that this Association will demonstrate not only to itself but to others, the value of adopting methods of improvement of their

flocks, and that similar bodies may be formed in other parts of the State. And moreover, I see no reason why this cannot be done.

Some Sericultural Problems. *

BY

N. Rama Rao, B.A., B.L.,

Superintendent of Sericulture in Mysore.

It may be safely said that Sericulture is the largest and most important subsidiary industry of the State.

We all know and are in the habit of congratulating ourselves about the excellence of the Mysore silk, and of the Mysore silk-worm. The Mysore silk-worm is undoubtedly the best polivoltine silk-worm in India. It is robust, easy to rear, and produces a silk of great lustre and remarkable tensile strength and elasticity. No Mysore home which has seriously cared for this worm has had reason to regret the choice, and the little creature has repaid care a hundred-fold in added income and comfort. But the Mysore worm has its defects, or to put it more kindly and gratefully, is capable of improvement ; and I should be sorry to think any of us are not. It takes too long to grow—a crop is often as long as five weeks under rearing, and seldom less than 30 days ; and the cocoons contain too much floss in proportion to the silk. The quantity of reelable silk in the cocoon is also comparatively small. Now there are two ways of improving a worm ; selection in the same breed to develop the qualities we want, and hybridization with other breeds which pre-eminently possess those qualities. The first is comparatively long and laborious. The second is shorter and more striking in its results, as we take the qualities which are already evolved, and transfer them to our stock as far as possible ; but it is a business which requires great care and skill, as the operations are subject to very complicate laws of heredity. It happens that the offspring of a mixed race are seldom like the parents, but break up into groups showing all kinds of ancestral qualities and combinations of them. When at last after careful and patient work, we have succeeded in getting a worm of mixed ancestry, which breeds true, we are said to have 'fixed' it. To breed true is to produce offspring which are in all essential qualities similar to the parents.

* Speech with which the subject was opened for discussion at the Fifth Annual Meeting of the Union on the 10th November, 1922.

This important work was entrusted to Mr. M. Yonemura. our Silk Expert. who brought to it not only knowledge and earnestness. but experience gained by years of special work on this very subject in Japan. He selected the best silk-worms of France. China and Japan and conducted a series of very silkful and interesting experiments with the object of fixing a worm which should combine all the best qualities of the Mysore worm—polivoltine nature. health. and lustre and strength of fibre,with the higher silk-yielding quality of the foreign worms. I do not propose to take you into the details of those experiments. which are too involved and technical. I shall only announce that Mr. Yonemura has succeeded in fixing three important new races with two varieties in each. which in great measure satisfy the objects we had in view. I have here sample cocoons of these new races. and shall pass them on for your closer and more leisurely inspection. The new races are :—

Mysore—Chinese : in two varieties. the one green (like Mysore) and the other white.

Mysore—French : also in two varieties. the one green like Mysore. the other white, unlike either parent.

Mysore—Japanese : two varieties, similar in appearance to the Mysore—Chinese.

(The samples were sent round, with the pure Mysore, and the pure Chinese, French and Japanese cocoons with which the hybridization operations started.)

These new races take on the average about 26 days to rear. as against the 30 to 35 of the Mysore worm : they are just as robust and easy to rear : and they are polivoltine : but they produce a cocoon which contains (on the average) from 20 to 40% more silk than the Mysore cocoon. Seed of the new race was distributed during the last two months among selected rearers. and the results fully confirmed our anticipations. I request the co-operation of members of this Union to conduct rearings with the new seed both to satisfy yourselves that it is what it claims to be, and to multiply it for further seed production. As the leaders of agricultural progress, it is your privilege to verify the results of research. and to popularize them.

The next point on which I wish to speak and on which I shall have to be very brief indeed, is the need for improvement of reeling.

Nothing can be sadder than the way in which good cocoons are converted into bad silk in our country by people who neither know nor care to learn better methods. The loss to this country by bad reeling can be figured in tens of lakhs of rupees every year. It is our bad reeling which enables cheap foreign silk to hold its own and even make head-way in India. This is a great pity even as it is and would be a crying shame if it should continue even after the quality of the cocoon which is already good, should become better. We must have filatures all over the country, and we must improve indigenous cottage reeling also by introducing more efficient treatment of cocoons and better croisure, and removing such defects as uncleanness and breaks.

The next point is the need for sericultural co-operation. Rearing, which is essentially a poor man's industry, offers a great field for profitable co-operation. In Japan, which is the wisest and most progressive of silk-producing countries there are over a thousand Co-operative Sericultural Societies. These Societies cover the entire range of the sericultural operations—purchase of seed cocoons, examination of seed, mulberry cultivation, appointment of experts, disposal of cocoons and short-term credit for rearers. There are practically no Sericultural Co-operative Associations in Mysore, though Mysore is the premier silk producer in India. The ordinary Co-operative Society will *not* do for sericulture, for sericultural co-operation presents special features. The ordinary agency for organizing co-operation will *not* do for promoting sericultural co-operation, because the work requires an intimate knowledge of the industry—both economic and technical—no less than a grasp of the basic principles of Co-operation. The movement demands not only a close relation between the Departments of Sericulture and Co-operation, but the helpful sympathy of all gentlemen, who like you take an interest in the prosperity of your fellow subjects and in the advancement of your country.

Animals are very much the creatures of habit, and the daily work connected with them should be done as regularly as possible. This includes feeding, milking and grooming, which they look for at certain times, and which, if neglected or done irregularly, frets them and makes them irritable, with consequent bad results.—*Live-Stock Journal.*

Sale of Implements, Manures and Seeds through Co-operative Societies.*

BY

A. K. Yegna Narayana Aiyar, M.A.,

Dip. in Agri. (Cantab.), N.D.D., etc.,

Deputy Director of Agriculture in Mysore.

In the course of few remarks I propose to make, my intention is not to give an account of Agricultural Co-operation in general, nor indeed with special reference to our own conditions. Such a wide subject is quite outside the scope of the discussions of the kind that usually come before our Union. I am proposing to confine myself to the consideration of how best we can make use of the present co-operative organization for the betterment of our agriculture, how in fact we can utilize the services of the two departments of Government, the Agricultural and Co-operative, in order that we can get the maximum advantage. If, in doing so, my suggestions appear too small and insignificant in comparison with what has been achieved in other countries and what we ourselves may hope to achieve in the fulness of time, my only excuse is that I feel we ought to proceed along lines which, however modest they may be, have yet some chances of permanent success.

For in the past, our experience with Agricultural Co-operation or for that matter with everything other than credit and to a minor degree of stores societies has been most discouraging. That is within the knowledge of every one who knows anything at all about the work of co-operative departments in India. In Mysore, at least, we have not been debarred by a dread of the difficulties from making attempts; in fact, we have started societies for the supply of implements, of seeds and of manures; we have had societies for the joint marketing of produce. We have even tried our hard at ambitious ventures like societies for co-operative production by the use of machinery, such as pumping plants for irrigation, jaggery boiling, and juice milling. But in all these we have failed more or less, more in fact than less. The result has been a striking demonstration of the great obstacles in the way. And this is in spite of the fact that on the surface at least there are many conditions which will be deemed

* Speech opening the subject for discussion at the V Annual Meeting on 9—11—1922.

favourable for co-operative effort. A nation of small farmers, using the simplest implements and buying and selling in the most disorganized manner and tyrannized over by wholesale dealers, why one would think that co-operation was the thing to relieve them from their ills, to put more money into their pockets, or to make their labour more efficient and more remunerative. And yet the result has all been different from all one's calculations. Is it time then that we revise our ideas and exercise greater caution and advance only on the firm and plain ground, though only slowly ?

What is the easiest form of co-operative effort next to a banking or credit society ? Supply or store societies are admittedly the simplest. Let us then start with this line of work. What are the articles that we shall advise such societies to stock and supply ? In answering this question, we should recall to our mind that the ryot's requirements by way of implements and other appliances are exceedingly few, and are moreover such as the ryot himself can make or rig up and that very few indeed are purchased ; secondly, his requirements by way of seeds are, save under exceptional circumstances and with all but the poorest, met from his own seed supply selected and set apart out of his own produce, and are therefore not an article of purchase and sale ; and thirdly, that in regard to manure, almost his whole and only manure is not such as lends itself to commercial handling.

Well, that means that there is nothing to supply and that there is no scope for such societies. Ordinarily, it would be so, but circumstances alter the case fortunately for us. The fact that with the willing co-operation of a fairly responsible ryot population, the local Agricultural Department has laboured during the last ten years or so, gives a different complexion to the matter, and, as a result, there is quite a variety of new implements, seeds and manures that such societies can stock and sell. For instance, the improved ploughs are quite popular and are coming into use in increasing numbers ; there are as a matter of fact over ten thousand of them in use already in the State. We have other implements, like shovel cultivator, harrows, sugarcane mills, etc., which are all being sold in fairly large numbers, not to mention plough shares and other spare parts of these implements. We have again seeds of superior varieties of the important

crops like ragi, paddy and castor, which are in great demand, and are being grown over an increasingly large area every year; and as the years pass, we hope to be able to supply improved strains of many more crops of the State. Then there are the commercial manures like oil-cake, sulphate of ammonia, superphosphate, etc., the use of which is also being largely popularized; all these lines of work are full of promise and even now, the business done in them is by no means insignificant. During the last official year alone, *i.e.*, 1921–22, the sales of these articles from the different depots of the Agricultural Department amounted to Rs. 35,681; and it has to be remembered that there were only 23 depots for the whole Province. There is not the slightest doubt that this will increase by leaps and bounds as the years go by.

Well, even as it is, that is a business of sufficient magnitude to be taken by for at least as many co-operative societies. There is little in the use of these implements that is difficult or complex: they are not like investing in large scale machinery for co-operative use, doubtful in their advantages and certain in their troubles: the business is not a large commercial undertaking like the sale of produce with powerful merchants to compete against and with only the native talent of the village to manage it. The business is, indeed, an exceedingly simple matter.

Can we not then entrust co-operative societies with this work? We need not go into the question as to whether new and special societies should be started for this work or the present credit societies themselves take it up as a side line. I personally favour this latter method, but it is a small matter and need not concern us further. You will admit then that the work is such that co-operative societies, even in their present state of development, can take up.

If so, what facilities are required to make it worth the while of societies to take up this business? This is a most important question. For it is not that we have not already started something on these lines; in fact, in the extensive variety of the attempts we have made in this State, it is impossible that such a small matter should have been omitted. Trials of more than one kind have been made, but all have failed.

What is the reason ? There has been a variety of causes, but one at least is this. As you know, a co-operative society or for that matter any similar business, expects to purchase at wholesale prices and sell at retail prices, and looks to the difference between these two prices to pay itself for its pains. It happens that, in the case of these particular articles, there has been no such difference. The wholesale price is not less than the retail price, and in some cases, the societies found it impossible to charge any profit at all, because the supplier himself was selling at cost price next door. Let us explain.

The aforesaid stock-in-trade, *viz.*, implements, seeds and manures are sold to the society by the Agricultural Department at practically cost price. I say practically at cost price, because a small profit is charged even now. But this profit is practically nothing. The Department, through its depots, sells to individual ryots and others also at the same price. Being interested more in seeing that the use of these articles extends, rather than in the sale of these articles as a business proposition, the Department tries to sell them as cheap as it can, *i.e.*, practically at cost price. A co-operative society, on the other hand, is a business organization and expects to make, if not a profit, at least enough to cover expenses and pay a reasonable return on the capital. Of course, a kind of impulse and an appreciation of the helpful character of a co-operative society have prompted many a society in the past to take up this work, but it would be obviously impossible to expect them to continue it, much less to expand it as we wish. Unless therefore the societies can be supplied these articles at a much lower price, than that for which the Department sells them to individuals, the societies cannot be expected to take up the business. And the Department cannot supply them at a lower price, for they sell at cost price to all, to societies and individuals alike, and to sell to societies at a lower price would mean incurring a loss to that extent, and this loss will be an increasing figure with the increasing bulk of business with the co-operative societies.

Will the Government be prepared to shoulder this and is it fair they should do so either ? I think not. What then is the alternative ? The alternative is that the Department should sell the article to the societies at cost price and to individuals at a slightly

higher rate, the latter being the rate at which the societies themselves should be bound to sell to their *clientele*. In that case the way would be slowly paved not only for the establishment of good co-operative societies with the elements of permanence in them, but also for the gradual withdrawal of the Department itself from this work of purchasing and selling, which will be taken up by private individuals also. It is with this two-fold object then that I suggest this method of encouraging Agricultural co-operative societies. At present the district staff which is all too meagre and is in urgent need of strengthening, is not able to render that amount and that kind of service which it is its duty to render and which only they are competent to render, because a great deal of their time is taken up by these commercial transactions they have to attend to. The work and worries and expenses incidental to this work are too great and are certainly detrimental to their usefulness. I shall not labour this point however.

I said the sale of these articles is an expanding line of business, but unless we pave the way now for it to pass into the hands of societies and individuals, its progress will be limited by the funds the Government may be able to vote for the increase of the staff and a multiplication of the depots. Furthermore it is quite on the cards that, if private individuals desire to take up the business at all, they may agitate for the department withdrawing from the business altogether and that it should not compete with them in what are admittedly unfair trade terms.

A small business and one comparatively easy of management like this, if entrusted to co-operative societies, may be the means of developing them to take up some of the larger forms of co-operative agricultural work. I can think of no more powerful ameliorant of the conditions of rural life than live co-operative societies. In rural areas, agriculture is the breath of life and a good co-operative society, if it serves any interest at all, would serve agriculture most. As an organization, it offers peculiar advantages for the Agricultural Department to work through. The fact moreover that the State has such a large number of societies scattered all over, a good number of which, at least, can gradually be entrusted with this work, carries the work of this department over a much wider area than can be served at the same cost by the depots of the Department.

This matter of a wholesale price, then, is the first facility that has to be extended. This will mean that articles will have to be sold at an enhanced price ; what profit can be charged by the Department so as to create a fair margin between wholesale and retail prices, will have to be decided somewhat arbitrarily. I suggest that implements costing more than Rs. 50 be charged 6%, implements costing less than Rs. 50 be charged 10%, and sundries like spare parts, bolts and nuts, etc., 12%, and seeds and manures, 10%. It is for the members to decide whether the principle is correct and, if it is accepted, these rates can be altered more or less.

I would also extend a further concession, *viz.*, that in the case of societies established where there are depots at present, these latter should restrict their sales and put the custom into the hands of the society. The society, of course, will be under an obligation to sell to all cash purchasers at the same rate as the depots do.

It is also a curious circumstance which I may bring to your notice, that the Agricultural Department itself is getting no reduction in price on wholesale orders from its suppliers ; for instance, the Nahan foundry and the Kolar Mission charge the same rate whether you buy one mill or plough, or whether you buy a dozen or a hundred. Effort will have to be made to secure better terms from these suppliers, and other steps also taken, such as the local manufacture of some of the articles at least, whereby the prices can be reduced. This will have to be done, of course, in any case, but with any enhancement in prices consequent upon your decision, this will be most imperative.

I may close these remarks with what you, no doubt, see is the gist of the whole matter. If you want co-operative societies to undertake the sale of implements, seeds and manures, both in the interests of the co-operative movement and all the advantage it brings in its transactions and also in the interests of the Agricultural Department, whom you will be thereby freeing for more useful service than you will have to pay an enhanced price for these articles. Would you advise the Department to take this step ? If you would, all others are matters of detail which can be left to the officers of the Department to work out.

Agriculture as a Vocation.

BY

Gundappa S. Kurpad, B.A.,

Vice-Principal, Mysore Agricultural School.

One hears on all hands, complaints that the proper type of student is not attracted to the Agricultural Colleges and Schools. By the proper type is meant those that have an active interest in the cultivation of their lands; in other words, those that would take up farming as their sole business. Most of the people who come to these institutions do possess lands, and it therefore becomes all the more interesting to inquire into the reasons which make so many young men fight shy of the farmer's profession.

At the present stage of the country's development, it is natural that most of the graduates turned out by the Agricultural Institutions are absorbed into Government service in its various branches. Both research workers and executive officers are required by the various Departments of Agriculture, and these colleges are now serving as a training ground for the recruits to the Agricultural Departments. After the Government requirements are met, there is always a certain number of young men left over, and it is some of these that seek some profession which has not the slightest relation to all their training and work in the agricultural colleges. It is then pertinent to ask why these young men choose deliberately to throw away a training, got after the expenditure of so much money, energy and time. It cannot be that they look upon farming as a degrading profession or that farming cannot give them a decent livelihood, for the essence of their training has been to show them that farming is at least quite as honourable a profession as any other and that a decent living is always assured to the industrious and intelligent farmer. There must be other causes which drive young men away from agriculture.

It must be admitted at once that a good proportion of the young men seeking admission to agricultural colleges, do so with the express intention of entering service in the Agricultural Departments, and even among those whose ultimate goal is not Government service, many cannot resist the temptation of entering Government service especially if they happen to pass high. It seems, therefore, obvious that the business of agriculture does not look to them to be attractive enough to be pursued as their life's profession. This is a deplorable

state of affairs, since it reflects credit neither on the men trained and sent out into the world by the various Agricultural Institutions, nor on the Institutions themselves. If the aspect of the business of farming had been treated in the college in the proper manner and if the instruction had been intelligently followed and appreciated, such an apathy towards farming would not exist. On the other hand, the students would be so enthusiastic about farming that the existing inducements for entering Government service would be insufficient to allure them. It seems as if as much stress is not laid on the business of Agriculture, as on Agricultural Research. It should not for a moment be understood that I am decrying Research. It is on Research work that the whole advance of Agriculture rests, and without it very little progress would be possible. Research is of the highest importance and requires the attention of the most capable workers in the field. But it is only a small proportion of the agricultural graduates that can engage themselves in Research work in the various Government institutions ; the bulk of them have to seek some other line of service or take up farming as their profession. Since it is the avowed intention of the agricultural colleges to turn out men who will be thoroughly equipped to conduct farming on the most up-to-date and profitable lines, a good deal more stress ought to be laid on this portion of their training than is now generally done.

It must be emphasized here that although a great many people own lands, and are getting returns from their lands, still, most of them cannot be said to be following agriculture as a profession. In most cases the land is leased out to the cultivators and the only time when the owners realize that they possess lands is when they receive their portion of the produce of the land. So that it is more or less merely a compliment to say that they are farmers or agriculturists. It is only those who attend personally to the cultivation of their lands and who depend on the produce of their lands for their living that can be really said to be following Agriculture as a vocation. It is therefore worth while discussing what attractions and what disabilities, Agriculture possesses as a man's vocation, and to see if the attractions are sufficient to lure young men away from Government service and induce them to take up Agriculture as their life's business.

Whatever the kind of farming one follows, whether it is general or mixed farming where all kinds of crops are grown and all sorts

of live-stock are kept, or whether it is specialized farming where the farmer restricts himself to the intensive cultivation of one or two special crops or breeds only one or two kinds of live-stock, a farmer does not and cannot expect to make a fortune as is sometimes done in other professions. Men who have accumulated a fortune solely through farming are very few. While some other professions might enable one to accumulate a fortune rapidly, they are also capable of ruining him completely, equally, if not more quickly. In the case of Agriculture although there is not much chance of piling up a big bank balance, there is still less chance of a man being reduced to beggary. There is very little chance for speculation in Agriculture, and when honestly and intelligently followed, it yields a steady and comfortable income. Being out in the country, a farmer is not the victim of a city's various distractions, he is out of a congested atmosphere, breathing God's air in all its freshness, and can thus lead a more healthy life than his city brother. For those who prefer an open-air life to the restricted life of the city, this fact alone is enough to turn their thoughts towards farming. It is common experience that some every-day requirements like milk and curds are atrociously adulterated and extremely dear in the cities, whereas out in the country, it is not so. Further a farmer is his own master, he has not to please some officer or other at every turn, he is not worried with the constant dread that somebody might find some fault with something that he has done, but he can do what he thinks is right and rest content without any fear of rebuke from anybody. It is only those who occupy subordinate positions under more or less capricious officers that can realize the amount of worry that is involved in Government service. This sort of incessant worry, coupled with unhealthy surroundings, soon makes a man a stranger to robust health and happiness and makes him a discontented, half-healthy, despondent human being. The truth of this will be realized by, I dare say, all the subordinate officers in this country. This is one side of the picture.

On the other side are all the facilities which go with city life, convenient shops for all commodities, schools and colleges for the education of the children, places of amusement, the company of people of the same social status, and all the bustle that is usually associated with cities. Further there is the attraction of power—of having belted peons about the house, of being able to order people

about—that is associated with superior Government service. Many of the advantages which appear to be attached to life only in the city are now also obtainable by a man out in the country, thanks to the modern means of communication that are at his disposal. The automobile, the telegraph, and the telephone have helped to annihilate distance and put the country gentleman as much within reach of city conveniences as his city brother. The absence of residential schools and suitable boarding houses in our cities makes the problem of education of the farmer's children a really acute one. Unfortunately, the Hindu community is so busy disintegrating throug internecine squabbles that it seems to have little leisure for attending to such vital matters as affording proper facilities for the education of the children of the rural parts, by organizing proper boarding houses in cities and establishing proper schools in rural centres.

It must be admitted that it is mainly a matter of personal inclination which profession one chooses. What look to be advantages to one, may be the very things that seem disadvantages to another. There are certainly cases where other considerations than personal inclinations have got more weight ; but it is to those who have not got any decided predilections either way and who would be all the better for some knowledge about the profession of Agriculture in deciding their vocations, that this article is mainly addressed. In order that this profession should be entered with a full knowledge of its requirements and exactions, it should be our business next to see what it is that makes a successful farmer.

First and foremost, a farmer should not be afraid of any kind of work and must be ready to put his hand to any work that comes across his way. This need not scare anybody away from farming, for it does not mean that the farmer should engage himself in strenuous manual labour day in and day out. All that is implied is, that when circumstances are such that he has to do strenuous work, he must be prepared to do it and not shirk it. Farming conditions are so fluctuating that no specific time-table can be followed as in factories. The farmer must be able to decide what he should do under certain conditions which he may not have encountered previously. This requires a fund of common sense and a little of intuition, neither of which are taught in any college. The farmer must possess the ability to control labour properly. Hard words and rough treatment drive

labour away, and especially at the present time when on every hand we hear the cry of scarcity of labour, everything should be done to attract labour on to farms. Kind words, sympathetic treatment and an attempt to understand the view-point of the workmen attract men to farms even when the wages obtainable there are no more than what is available elsewhere. Patience is doubly a virtue in a farmer. Any money and trouble spent on efforts to mitigate the lot of labourers will all be paid manifold in that the farmer will have a contented lot of labourers which means that he can get more and better work out of them. Perhaps the most important of all is self-confidence. A feeling that he is going to succeed in his business whatever happens ; and this is only born of accurate knowledge of what he means to do, and what difficulties are likely to crop up. It goes without saying that the kind of farming that one takes up must be such as appeals to him, for unless that is the case he is not likely to be interested in his work, and this interest is essential if he has to seriously think about the work he has to do, and plan out everything carefully. Above all, the farmer must have plenty of grit in him. He must have the faculty of looking adverse circumstances in the face, and to smile whatever happens. Farming is not a soft job, and it is only he who takes things as they come, be they good or bad, serenely and with a determination to succeed, that will be successful. All this may look very formidable on paper, especially to one who is looking about him for a suitable vocation, but he need not be scared. Converted into practice it merely means that one must have his wits about him and must not be discouraged by things which may seem terrifying but may after all be trifling.

The foundation of farming is land, and a man must possess land, and a certain amount of capital to work the land, before he can become a farmer. A few words must therefore be said about the availability of land and capital for the prospective farmer. As has already been mentioned, most of the students who come to the Agricultural School at Hebbal do possess lands, as this is one condition of admission to the School. But in many cases this land is not held by them, but by their relatives, very few of whom seem inclined to put the boys on the land. This can only mean one of two things, either they think that the boys have not got the stuff in them for a farmer's life or they have no confidence in the training obtained by their boys at the

Agricultural school. It follows that either the parents and guardians of these boys sent them to the Agricultural School without any thought of what they were going to do with them after their training was over, or that they sent them there with the hope that they would somehow be taken into Government service. This is not a desirable state of affairs, and there must be a way of improving matters.

Arguing in this way, it is obvious that the elders of the community must give the lead if we are ever going to realize the ambition of seeing all the students of the Agricultural School turning their faces resolutely away from Government service and taking up farming as their life's work. The elders interested in the advancement of Agriculture which incidently also includes the well-being of the community should send to the school only such boys as take an interest in farming and are likely to become good farmers after coming out of the Agricultural School. The boys must have both the mental and physical equipment necessary in the making of a successful farmer. The elders, on the other hand, must have prepared matters, against the boy's return, in such a way that they can start off on their careers without losing any time. It must not be a case of sending a boy somewhere especially to a place where he can get a scholarship for two or three years, put off every consideration of the boy's future till he returns, and shove him into any odd place that comes handy at the time. It may be that, under these conditions, the number of students in the school will be few, but that need not discourage anybody. We will be conscious that really good solid work is being done, and if progress is slow, it is none the less certain. A beginning in this direction might, I think, be made if a personal interview with the parents or guardians of boys entering the school, be insisted on, in every case, by the authorities concerned.

The question of capital need present no difficulty. It is incorrect to believe that, like other kinds of business, farming also requires a large amount of initial capital. On the other hand, one can suit himself to the amount of capital one can raise. It is, of course, evident that the greater the capital, the greater is the work that can be done always remembering the evils of over-capitalization. Farming can in most cases be begun with a capital of about a thousand rupees and as a man goes on, he can save or raise more capital as he wants. This small amount of capital can, without difficulty, be

obtained by any student of the Agricultural School, from Government, on application to the Director of Agriculture. A modest beginning, and a cautious advance are the secrets of success in farming on a small scale. If the young men who go out of the school can get over their diffidence about the future, and start work with a will to succeed, I have no doubt that they will meet with success.

The Manifold Virtues of Milk.

If we were to summarize the advantages of milk we should say that it contains food accessories called vitamines, which are necessary to growth and maintenance ; it contains proteins of a high quality and that are easily digested by children ; it contains mineral matters, especially lime, which is needed for the growth of children ; and it contains a fat which, having a low melting point, is easily digested. From the cost standpoint we see that it is cheaper to buy energy for the body in the form of milk than it is to buy it in the form of meat. There is an old saying that "an apple a day will keep the doctor away." I feel that it would be equally true, or more so, to say that an ample supply of milk a day would keep the doctor away. Why not have more milk cows, and, if necessary, fewer beef cattle ? The cows give milk, which is better food than beef, and she is at least five times more efficient in the conversion of feeds into food than is the beef steer.—*Agricultural Gazette of New South Wales.*

NOTES AND COMMENTS.

Our Annual Meeting.

The Fifth Annual Meeting was held in the Daly Memorial Hall on 9th and 10th November as usual. It is highly gratifying to note that the majority of members who attended the meeting were non-officials directly interested and engaged in Agriculture. Dr. Leslie C. Coleman, M.A., PH.D., Director of Agriculture in Mysore and President of the Union, welcomed the members and Mir Humza Hussain, Esq., B.A., B.L., Member of Government in charge of the Department who presided on the occasion, delivered an address. Both these addresses being printed in this number call for no special remarks on our part and we simply invite the attention of our readers to those speeches which contain much valuable advice and information. The last day of the meeting was spent on the Experimental Farm at Hebbal as usual. In spite of the bad weather a very large party was present, and members and visitors were taken round the farm in batches by the staff. The students of the Hebbal Agricultural School celebrated the School Day also on the same date and added much to the liveliness of the occasion.

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Agriculture as a Vocation.

We invite the attention of our readers to the article headed as above and published in this issue. Mr. Kurpad raises a number of interesting points which are worthy of discussion in the interests of agricultural improvement in India. Many a foreign agricultural expert who has visited this country has said that agriculture in this country has not improved since the intellectual classes have till now kept themselves away from it. Even now, when the requisite theoretical and practical training is given in the various Agricultural schools and colleges, the business side of the profession does not seem to be adequately treated. Those boys who get back to the land with a view to take up agriculture as their vocation seem to do so with a wrong notion of what a farm ought to be. Most of the farms attached to agricultural institutions being

experimental farms and not commercial ones, the boys seem to think that all the paraphernalia necessary for an experimental farm run on scientific lines and irrespective of cost are also necessary for a commercial farm. One way of remedying this is to establish purely commercial farms on which the boys get the necessary practical training before they are granted the final diploma or degree. From personal experience we know of such a system existing in Germany, but the farms are private ones and the students get paid for their work on the farm. The owners of such farms being men dependent on the land for their living, naturally run their estates on strictly business lines. The experimental farms attached to institutions in Germany are meant for the use of the professors in their research work, and students are there shown only the results of experiments and do not get any practical training there. Thus the student who gets his practical training on a commercial farm from the very commencement gets an opportunity for the strong development of his business instincts. Such a private agency being absent in this country, it is the duty of Government to attach such farms to agricultural institutions and prove to the people, by publishing facts and figures, that such farms are really run on commercial lines.

Apart from this defect in the present system of training, there is another factor which discourages many a successful agricultural student from following a profession which may be to his best liking, and it is the system of scattered holdings which makes his supervision difficult and inefficient. Consolidation of holdings by legislation seems to be the only way to remedy this evil.

When the land is one's own, there is generally no possibility of retiring from the profession except by selling the property itself. To enable those who do not possess land, but only the requisite training to make business out of agriculture, to take to the profession and retire after a certain number of years there is a very good system in Germany and that is, the letting out of State domains on long lease to people who want to make money out of a farm. Such a system does not demand any capital outlay on the part of the agriculturists, but only the floating capital needed to produce one season's crop. Want of similar facilities in this country seems to be in the way of some of those who want to take up agriculture as a profession. For some years past, there is a talk in the State of forming model farms or middle sized

landed estates for those who want to settle on the land. If Government only grants arable waste land for such estates, there are really very few men with the necessary capital to invest in bringing such land into shape and then wait patiently for a number of years before the estate begins to pay as a whole. If, on the other hand, such estates are brought into working order by investing the necessary preliminary capital and then leased out for a period of not less than 15 years to prospective settlers, there may be a chance of settling some intellectual families on farms. The Agricultural Department with its trained and experienced staff ought to be able to bring a few such holdings into existence, show their commercial success and then lease them out. If people with training and experience cannot show the way and infuse confidence into the minds of prospective intellectual Agriculturists, then there is surely something wrong with them. [B. N. I.]

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The Kolar District Sheep Breeders' Association.

An interesting development in the Sheep Breeding Industry has recently taken place in the Kolar District, in the formation of a Sheep Breeders' Association. This is the outcome of an active interest taken in that District in the improvement of the sheep as a wool-bearing animal, and the adoption of up-to-date methods in caring for both sheep and wool. Membership is confined to agriculturists actively engaged in rearing sheep in the District, and a membership fee of one rupee per annum with an admission fee of eight annas is charged. Up-to-date thirty-five members have joined the Association.

Briefly, the objects of this organization are to co-operate with the Agricultural Department in experiments in sheep shearing and dipping, and to give co-ordination to and assist in the activities of the Department in the spread of better methods of sheep husbandry in the Kolar District, as well as to market wool on a co-operative basis. To bring about these results, members undertake (1) to maintain a flock of at least 20 white ewes within a year of joining ; (2) to gradually replace all coloured sheep in their possession by white ones as fast as is practicable ; (3) to castrate all ram lambs not specially selected for breeding purposes ; (4) to make use of better rams in so far as these are available ; (5) to undertake experiments in

clipping, dipping, etc., and (6) to have all sheep dipped twice yearly against skin diseases and parasites, and to accept suggestions and assistance given by the Agricultural Department.

An annual sheep show will be held by the Association, probably in connection with the District Conference, and suitable prizes awarded.

The management of the Association will be conducted by a President, Vice-President, Secretary and Committee of four members to be elected annually by the general body. For the first year, it is proposed that the first three offices should be held by the Live-Stock Expert, Vice-President, Kolar District Board, and Agricultural Inspector, Kolar, respectively. The first General Meeting of the Association will be called in January 1923 for the approval of the constitution and election of officers and other general business.

The demand for white sheep as foundation stock from members has already assumed tangible proportions, and an effort to meet the demand is being made by the Live-Stock Section of the Agricultural Department. Selected sheep, white in colour, of good wool-bearing tendencies and of a suitable age for breeding are being used for this purpose. During the months of October and November one hundred such ewes were distributed among members at cost price, and arrangements are now in hand to supply a further demand for a hundred and fifty more. A proportion of the hybrid ram lambs bred on the Government Sheep Farm will also be distributed to members of this Association as they become available.

There is promise of this movement being the first step of an important development in the Sheep Breeding Industry in Mysore and in the formation of an agency through which much may be accomplished. The sheep industry occupies an important place in Mysore Agriculture, and is capable of much profitable development on the proper lines. It is to be hoped that this new enterprise will develop successfully, and pave the way for similar development in other parts of the State. [W. D.]

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THE MOST EXPENSIVE BULL IN THE WORLD

(Vide page 213)

A LOT OF 50 WHITE EWES PURCHASED BY
MEMBERS OF THE KOLAR DISTRICT SHEEP BREEDERS' ASSOCIATION

(Vide page 211)

The Most Expensive Bull in the World.

"What would be the cost of a good bull ?" This is a question frequently asked, and the reply being furnished is usually followed by the statement that such an animal is " too expensive ". There are yet many people who fail to realize that the most expensive bull in the world is the scrub bull. No scrub bull can transmit qualities that he does not possess. His offspring are fore-doomed to be scrubs, inheriting all the undesirable attributes of their sire. Breeding from scrubs is a retrograde policy. There is only one way to improve the breed, and that is by using a sire of good breeding and desirable conformation. We are publishing elsewhere in this issue a photograph which brings out the effect of using such a sire. Both parents and the offspring are shewn. That the bull (which is the same as that shown in the last issue of this Journal) is decidedly superior to the cow in general stamp and conformation can be observed by the most casual. It is however interesting to notice how the calf takes after the sire in conformation. Note the even symmetry and growth, the deep chest, and well placed legs. When the photograph was taken, the calf was four months old and was then as big and well grown as the offspring of a scrub bull would be after a year's growth, if such slow development can be so called. The cow and calf are privately owned, and the owner possesses no special facilities for raising cattle. There is no mystery attached to the business of producing good cattle, but there is one prime essential, and that is to " use better bulls ".

[W. D.]

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Fifteen Tons of Sugar per Acre.

Recent sugar journals (*vide* The Lousiana Planter, Vol. LXIX, No. 2) draw attention to certain phenomenal yields of cane produced in the Hawaii islands. With one such we head this note. Fifteen tons of sugar per acre and that from a 152-acre field ! Well, that represents in cane even with the most efficient of modern factories nearly a 120 tons of cane to the acre. Other yields are 118 tons of cane from a 19-acre field, 110 tons from a 85-acre field, 96 tons from a 126-acre field—yields which to us in India are truly staggering. It is said that with liberal manuring and irrigation and with select varieties of cane the yields can be increased. One wonders what may be the limit to such yields. Is anything like these yields possible in India, which is said to be the home of the sugarcane ?

Nearly all our cane is grown in small areas, capable of being treated most intensively. Yet, we have never heard of anything approaching these figures even from the best of our growers.

We are told that these yields have been obtained with a variety of cane called H-109. We would suggest that this variety be imported and its possibilities tested here. [A. K. Y.]

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Bounty on Home-grown Sugar in Great Britain.

An evil destiny seems to dog all Great Britain's attempts at sugar manufacture. It was more or less generally believed that the British farmer could never grow beet cheap enough to make a factory pay and that it was useless to attempt any such manufactory. The Great War, however, emphasized the necessity for developing the country's resources in such a way that she may be independent of foreign supplies at least to some extent, and acting under this commendable impulse, two large sugar concerns were started with a view to growing large areas under beet and manufacturing sugar therefrom. These, known as the Kelham and Chantley concerns, were practically the first large scale attempts made in that country and they received very substantial Government assistance. The Government subscribed half the capital and also guaranteed a 5% dividend. The concerns themselves expected to pay 11% dividend. Readers of the Journal may remember that at the time they were started (*vide* page 148, Vol. II) we noticed them in our pages, to which we invite reference for other details.

The first year's working has unfortunately been disastrous and has moreover demonstrated that the ventures can never pay under present conditions. The concerns which therefore were about to be shut down have been given a further lease of life by Government again coming to its support, this time with a very large bounty amounting to about £24 per ton of sugar made in these factories. The bounty has taken the form of an exemption from payment of the excise duty levied on all sugars in the country. With the present output, this sum will amount to nearly £480,000 per year and the concession is likely to continue till the output is almost doubled ; that is to say, the Government is prepared to forego every year nearly £1,000,000 of its revenue !

This is indeed excellent example, and ought to strengthen the hands of those in this country who claim that protection to nascent industries is one of the functions of the State. [A. K. Y.]

SELECTIONS.

I.

Increased Returns from Intensive Cultivation.

118 *Tons of Cane from One Acre.*

The Honolulu correspondent of "Facts about Sugar" refers to certain experiments in the intensive cultivation of sugarcane, conducted with a view to demonstrating the possibilities of getting a larger crop return per acre by the experiment station staff of the Hawaian Sugar Planters' Association. These have resulted in obtaining a yield of 15.85 tons of sugar to the acre from a seventeen-acre experimental field at Waipio, Oahu. The yield of cane was 118 tons to the acre.

These remarkable results are described and commented upon in a bulletin of the experiment station, which states :—"We are not prepared to say whether the yield of the plant crop can be repeated in this or subsequent ratoons. A great deal will depend on the weather of the winter months and the influence of the rains on the quality of the cane.

"An encouraging feature about these heavy crops of cane is that the methods used are clear-cut, simple and applicable to other areas of considerable size having similar soil conditions and water supply."

"A second encouraging feature about these heavy crops is that they were obtained, from unselected H–109 cane, and anything that bud selection has to contribute to the industry will express itself in still higher returns."

Going on to amplify in fuller detail the possibilities of larger returns opened up by the experiments and the problems involved in their practical application, the bulletin comments as follows :

"A third encouraging feature is that the variety H–109 may not be the best variety of cane which we have to-day for irrigated lands. An article in this issue by J. A. Verret shows that among the new seedlings we may have canes which are constitutionally superior. These seedlings, if better to begin with, will possibly lend themselves to improvement through bud selection.

"The question arises quite naturally as to what is the physical limit to the amount of cane that can be produced on an acre of land. When do we reach the limitations possessed by an acre in point of sunlight and root zone ? If these prove to be the limiting factors in production, we must work for yields in terms of shorter cropping periods.

"In other words, if we cannot produce, without undue overcrowding and consequent rooting of cane in the field, more than 118 tons of cane per acre in two years' time, we must then work for yields of this character in less than two years' growing time.

"A two-year cycle may prove a less economical cropping period than it is now held to be. If we cannot produce three very heavy crops in six years, we must then seek to produce four heavy crops in the same length of time.

"We may find, for instance, that it is better business to produce four crops of 100 tons of cane in six years (or one crop each 18 months), than to produce three crops of 133½ tons in six years (or one crop each two years). The gross tonnage of cane in each instance will be 400 tons per acre for the six-year period, and possibly we shall be better able to control the quality of cane under 18-month cropping cycles. Looking ahead to yields of this type, it must, of course, be remembered that we are discussing on better irrigated lands and that even then the success of such agriculture is entirely dependent upon our ability to control insect pests and cane diseases."—*The South African Sugar Journal, Vol.* 6, *No.* 6.

II.

Advantages of Deep Ploughing.

Points of Great Importance to Planters.

A lot depends upon the way ploughing is done, much more indeed than many people are willing to admit. In this country to scratch the surface of the soil with a Kafir hoe is sometimes to make all the preparation considered necessary for the growing of a crop, but it is always admitted in countries where good farming is the rule rather the exception, that deep ploughing is an indication of good farming. In the average community those farmers who plough deeper than their neighbours are considered the most successful managers, because deep ploughing means increased efficiency in the use of natural resources of the soil.

Distinction should, however, be made between deep ploughing and sub-soiling. The latter consists in loosening the sub-soil without bringing it to the surface or mixing it with organic matter. Its practice as to soils and seasons is far more limited than deep ploughing.

There are many reasons why deep ploughing is beneficial. In the first place the heavier soils, including clay and those which tend to take on the character of hard pan, are loosened up, which enables the roots to penetrate easier, and enables the soil to absorb rain water. Often

the roots of crops are confined to a rather shallow soil surface region by the refractory conditions of the soil beneath. It is in such cases particularly that sub-soiling would prove helpful.

Since all good soil management involves the use of organic manures of one sort or another, deep ploughing results in mixing this more thoroughly with the soil, with resultant benefits. As a general rule the failure to maintain a reasonable supply of organic matter in the soil coincides with a large decrease in productive capacity, not because the soil is exhausted in total food supply, but because bad physical condition of the soil results and the availability of the plant food present is thereby reduced. An important result is to increase the capacity of the soil to hold water in a form available to crops.

Where crops are likely to suffer from lack of water, which is especially the case on light sandy soils, and also gravelly soils, deep ploughing and the generous use of organic manures, coupled with thorough surface tillage are the primary method for the control of such conditions. On both sandy and clay soils this practice will increase the soil moisture to an extent equal to one or more inches of rainfall and since the total amount of water required to produce medium yields of crop is only eight to ten inches of rain, this saving may be an important factor in success.

A fertile soil teems with minute organisms which are beneficial in many ways, such as the proper decay of manure and stubble, and the gathering of nitrogen from the air. Stirring the soil, which exposes it to the air and gives it a better relation, stimulates these organisms and increases their number and activity.

Experiments carried out in America have showed that ploughing from eight to ten inches deep increased the number of bacteria and their production of ammonia, and reduced the tendency to the waste of nitrogen commonly known as denitrification.

All of the effects mentioned react upon the soil itself to increase the availability of the plant food present. The normal soil must be regarded as an immense store of mineral plant food elements in a slightly available form. A primary object of tillage is to increase the availability of these materials so that the crops can obtain what they require of potash and phosphorus.

The sub-soil is just as rich in these constituents as the soil, but it is only by the maintenance of the conditions associated with deep ploughing that it can be used as effectively as possible. Such methods proportionately reduce the need of commercial fertilizers, which are relatively expensive.

When coupled with the generous use of organic manures there is no soil condition where deep ploughing is not beneficial. But on light sandy and gravelly soils, which are already more loose than is desirable, no benefit will follow from deep ploughing without manure.

On heavy soils deep ploughing is beneficial, irrespective of the use of manure, because of the structural nature. It has been observed that green manure, ploughed under shallow, is positively injurious in many cases, but deep ploughing gives beneficial results. Humid and arid regions, temperate and tropical regions, alike respond to deep ploughing. Its practicability may vary somewhat with the season, quantity of manure turned under, and the succeeding crop, but these limitations cannot be discussed here, and on the average they had better be disregarded rather than that deep ploughing should not be practised.

Since deep ploughing involves turning the lower material up to the surface, and in certain regions the sub-soil tends to have some poisonous properties, it is not wise to increase the depth of ploughing too rapidly. An inch each ploughing is as much as is ordinarily safe where the fresh soil is turned on the top. If it is only partially brought to the surface as is the case with a certain type of implement, the increase in depth may be greater.

Ploughing to a depth of from nine to twelve inches is ordinarily practicable and is certainly desirable. There are, of course, limitations in the matter of draught, but in many instances more animals and larger implements are in the line of efficiency and economy.—*Tropical Agriculturist, Vol. LVIII, No.* 5.

III.

Ensilage from Cane Tops.

Some years ago a small silo at this farm was filled with chaffed sugar-cane, with very satisfactory results. It had to be used quicker than ordinary silage, however, owing to the rapid fermentation and decomposition on exposure to the air. With cane tops alone this trouble would not be so great, and properly made silage from tops should prove very satisfactory. Care would have to be taken that the silo was thoroughly packed, and the material evenly trodden down as it was put in.—*The Agricultural Gazette of New South Wales.*

The Mysore Agricultural and Experimental Union.

Proceedings of the Annual Meeting, 1922.

The Fifth Annual Meeting of the Union was held in the Daly Memorial Hall on the 9th and 10th November, 1922 and on the Hebbal Farm on the 11th.

Thursday, the 9th November, 1922.—First Day.

The proceedings commenced at 12-15 P.M., with Mr. Mir Humza Hussain, B.A., B.L., Member of Council, in the Chair. The non-official members mustered strong in numbers, some of them having come from such far off places as Ayanur, Sagar and Nagar in the Shimoga District. A large number of non-member agriculturists of the State also attended. The Hall was crowded with visitors, The following among other distinguished guests were present: Messrs. K. Chandy, B.A., Excise Commissioner in Mysore; P. G. D'Souza, B.A., B.L., Director of Industries and Commerce; K. H. Ramiah, B.A., Bar-at-Law, Officiating Registrar of Co-operative Societies in Mysore.

After the recitation of a welcome song composed and sent in for the occasion, Dr. Leslie C. Coleman, M.A., Ph.D., President of the Union, welcomed the guests and congratulated Messrs. S. Lakshman Reddi, and H. Sreenivasa Rao, two of our distinguished members, on the special honour they received at the last Dasara Durbar in recognition of the invaluable agricultural improvement work in which they are engaged. (His remarks appear elsewhere in this issue.)

The Secretary next read the Annual Report. The Report indicated slow but steady increase both in the number of members and in the quantity of experimental work conducted by them and showed that there was both scope and need for a further increase of both. (The Annual Report together with discussion on it and proceedings of the Business Meeting forms a supplement to this issue and is being sent separately to members.) Discussion on the points raised in the annual report was, on the motion of the President, postponed for the Business Meeting.

The Chairman then delivered the Annual Address for the year (printed elsewhere in this issue).

Mr. A. K. Yegnanarayana Iyer, M.A., N.D.D., &c., then opened a discussion on "The Sale of Agricultural Implements, Manures, Seeds, etc., by Co-operative Societies". His speech is published *in extenso* elsewhere in this issue.

A lively discussion followed.

Mr. H. Sreenivasa Rao supported the idea of sales through Co-operative Societies excepting in the case of implements. He pointed out that the prices of improved agricultural implements such as the Kolar Mission plough are already very high. If over and above these prices the Co-operative Societies charged a profit, people would not be able to purchase the implements. He would suggest that the Department obtain concessions from the companies concerned and sell the implements at cost price. Local manufacture of implements would also reduce the price.

Mr. B. Sreenivasa Iyengar of Anekal suggested that Government should provide the Societies with the capital required for the purchase of the implements, etc. The Taluk Boards might also supply the capital required on the recommendation of the Registrar of Co-operative Societies. He then dwelt on the delay which occurs in securing loans from the Central Bank and the difficulty which is felt on account of there being no Cash-Credit arrangement in the Bank. The Central Bank should allow the Societies the option of benefiting from a Cash-Credit system. He strongly supported the Takkavi loan method of supply of implements, etc., proposed by the Director of Agriculture. The discussion was adjourned and Dr. Coleman on behalf of the Union proposed a hearty vote of thanks to Mr. Humza Hussain for very kindly consenting to preside over the opening meeting. This was carried with acclamation. The meeting adjourned for lunch.

The discussion on the subject was continued after lunch, Dr. Coleman presiding.

The opening speech and the remarks made by Mr. H. Srinivasa Rao might have left the impression (although both the members did not mean it) that the Agricultural Department had not made serious efforts to secure reduced prices for these implements from their suppliers. The President drew the attention of the meeting to the point and explained that attempts have been and are being made from time to time to secure reduced prices but without success. He had found it impossible to secure any concession from the Kolar Mission ; he had taken up the matter again with them. As regards charging a small profit on the implements, etc., the policy of the Department had originally been to charge a 10 per cent profit, *i.e.*, the profit that other people would charge. The reason why this had been discontinued was that due to war there was a sudden increase of price of implements, and any profit charged over and above the prices would have seriously affected the introduction of the

implements. The increased prices, however, appeared to have come to stay and it seemed necessary now to charge a profit. According to a recent quotation received from England the new plough designed by the Department would cost about Rs. 28.

Mr. D. B. Sivarama Rao continuing the discussion on the subject, contended that the Societies had no capital to purchase and stock implements, and that the Societies should be permitted to purchase them from their Reserve Fund. Every Society had a reserve fund which was being at present deposited in Banks on small rates of interest. The Reserve Fund might be profitably invested on implements.

Mr. D. G. Ramachandra Rao invited attention to the fact that certain losses are bound to occur on seeds and manures stocked by the Societies and queried how the losses are to be met.

The President explained that the manures, etc., would be stocked for the benefit of the members of the Society and proper estimates should be made by the Society of its requirements or orders received from the Societies should be on the basis of orders received by it from its members.

Mr. Ramachandra Rao continued that he had particular instances in his mind of estimates not representing the actual demand for an article with the consequence that the article lay in store without sale for any length of time during which considerable losses had occurred. Under similar circumstances, the Societies might incur losses, and fluctuations in the prices of manures, etc., might bring in additional losses.

Mr. Yegnanarayana Iyer referring to the wastages during storage the previous speaker had spoken about, replied that in the enthusiasm for pushing on work many irregularities may have been committed in the past, but in the case of these Societies indents must be made after being decided at their meetings and the demands should be properly estimated.

Mr. A. S. Krishnaswami of Arakalgud suggested that seeds, etc., might be stocked in the Societies and the quantity left over without being sold may be taken back by the Department.

The President explained that as an experimental measure and for some time the unsold quantities would have to be taken back.

Mr. N. Krishna Iyengar agreed that the Agricultural Department should be relieved of much of the mercantile work. Where there are no Societies, the Department should continue to supply the implements, etc. The Societies might purchase these direct also

without the intervention of the Department but as they are not generally competent to decide what is good seed or useful implement or manure, etc., the technical advice of the Agricultural Department would have to be taken,

One might have imagined at this stage that every one had accepted the principle of sales of agricultural implements, etc., through Co-operative Societies, but it was really a question of who should start discussion from the opposite side, particularly as the Registrar of Co-operative Societies was among the audience.

Mr. S. Venkataswamy Gowda coming from Santhehally, Malur, maintained on the other side that he was not satisfied with the working of the Co-operative Societies. Further, they had no capital to invest on the work. The Taluk Boards had no funds, the reserves and surpluses referred to by previous speakers being all a myth. He would favour nothing but sales direct by the Agricultural Department.

Mr. Sylvester Pais, Coffee Planter, Chikmagalur, rose next. In his opinion the Societies were not doing the work entrusted to them properly and there was no justification for entrusting them with more work. The number of supporters of this view seemed large and the President interposing explained that the Department would, in the future, find the work too heavy to do and that therefore a start had to be made as regards making use of other agencies for furthering this work. Some chosen bodies should, therefore, be entrusted with the work as an experiment in the beginning.

The discussion was getting rather indefinite and vague and on the suggestion of the President, Mr. Yegnanarayana Iyer put his proposals in the form of the following resolution :—

Proposed.—

That it is desirable to entrust certain selected Co-operative Societies with the business of the sale of improved implements, seeds and manures, for the development of Agricultural Co-operation and for paving the way for the withdrawal of the Department of Agriculture from this business.

That during the transition period, both the Department and the Co-operative Societies carry on this business.

That the Department supply these to the selected Societies at cost price, and also stipulate that the Societies sell these at a rate fixed by the Agricultural Department to all cash purchasers.

That the departmental depots also sell these at the fixed prices.

That to make this scheme workable, the Department charge a

profit on these articles at a rate to be decided by the Director of Agriculture.

That the supply of these articles to the Societies be under the supervision of the staff of the Agricultural Department.

That where such Societies are started in places where there are depots of the Department, the depots restrict their sales and turn the custom over to the Societies.

That the Societies purchase the articles for cash from the Department.

The resolution was explained in Kannada also.

The discussion then centred round the question whether the Co-operative agency should be used at all for the purpose. Non-official members getting up one after another began expressing their dissent. The unsuitability of Co-operative Societies was the subject matter of most speeches. One non-official member advocated the increase of executive staff of the Agricultural Department to get through the increasing amount of sales in preference to the employment of the Co-operative agency. Mr. M. S. Lingegowda pointed out that the Societies are business bodies whose responsibility ceased with sales and who would have no personal interest in the purchaser, whereas the man who purchased from the Agricultural Department could always indent on the Agricultural Department for help when any trouble arose and obtain it as the Department would have a personal interest in him. The continuance of the present method of sales direct by the Department would result in a better understanding between the ryots and the Department.

Then rose Mr. Totappayya of Ittigehally, an old friend of the Department. He would not argue the case, sentiment being law with him. He exclaimed, "Let the fight be with ourselves, the ryot and the Agricultural Department. We want no third person to come between us." This, in fact, was the burden of many another song although an attempt was made by others to secure arguments in support.

It was no small satisfaction to the President (Director of Agriculture) to find such staunch friends of the Department but sentiment apart, he explained that the Agricultural Department had to deal with a large body of people. They had touched only some three per cent of them yet. Could we increase the staff to meet the growing demand or fassistance? Some organization other than the Department must be trained to take up the work.

The mover then accepted an amendment to add the words "as an experiment" in the first part of the resolution.

Mr. N. Rama Rao thought that little would be gained by starting the work in a few Co-operative Societies. He could think of scores of instances of Societies not working well on account of party spirit or due to various other causes. The Departmental energy released on account of its work being taken up by Co-operative Societies should be utilized in opening Departmental depots in the various places not served by the Societies.

The idea of the Department withdrawing from the business of selling implements, etc., did not appeal to the majority; in fact, they were not prepared to think of the idea, however remote the time for such total withdrawal may be, and when Mr. Rama Rao moved the omission of the word "for paving the way for the withdrawal of the Department from this business," and Mr. B. Lakshman Rao seconded it, the amendment was carried by a very large majority.

At this stage, the point was raised that the principle whether Co-operative Societies should be entrusted with this work at all had not been voted upon. Before taking votes on the point Mr. K. H. Ramiah, the Offg. Registrar of Co-operative Societies, who very kindly attended the meeting throughout, was requested to express his views.

Mr. Ramiah explained in an eloquent speech that the object of the resolution was to utilize the services of all agencies in order to push on the work of development. The Co-operative Department should not be misunderstood as being anxious to take on this extra work. The Agricultural Department with its limited resources could not itself carry on the work as fast as we would desire. It was with the view that all Government Departments should co-operate in furthering the agricultural development of the State that the resolution had been proposed. As regards the suitability of Co-operative Societies about which much was spoken (and which he had listened with an abundance of patience) he would assure the members that every precaution would be taken to start the experiment in selected good societies.

The speech created a favourable impression on the minds of members and when votes were taken all except two voted in favour of Co-operative Societies being entrusted with the work suggested in the resolution as an experiment.

A few amendments were proposed and carried and the resolution amended as follows, was put to the vote and carried.

Resolved.—

That it is desirable to entrust, *as an experiment*, certain selected Co-operative Societies with the business of the sale of improved agricultural implements, seeds and manures, for the development of Agricultural Co-operation.

That the Department of Agriculture supply these to the selected Societies at cost price and also stipulate that the Societies sell these at a rate fixed by the Department to all cash purchasers.

That the Departmental depots also sell these at the fixed prices.

That to make this scheme workable, the Department charge a profit on these articles at a rate to be decided by the Director of Agriculture.

That the supply of these articles to the Societies be under the supervision of the staff of the Agricultural Department.

That where such Societies are started in places where there are depots of the Department, the depots restrict their sales and turn the custom over to the Societies.

That the Societies purchase these for cash from the Department.

It was 5.25 P.M. when the discussion on the subject closed. The next subject on the agenda was then taken up.

THE HEBBAL PLOUGH.

Mr. H. Sreenivasa Rao opened discussion on the subject with a speech which is published elsewhere in this issue. Reports on trials had been received from :—Messrs. M. S. Linge Gowda, B. Sreenivasa Iyengar of Anekal, C. Venkata Rao of Mysore, K. Nagegowda of Kappalmadagu, A. Subramanyam, B.Ag., R. Hera Singh, and H. Ramachandra Shastry of Aradeshally. The reports could not be discussed separately for want of time. (They will be published in the Journal later on.)

A query from Mr. B. Venkatanaranappa elicited the information that a bar would plough at least twenty acres before wearing out completely. (Length of bar 18 in.)

Mr. Lingegowda added that the worn out bars might be preserved, two such could be welded together and used again.

Mr. B. Sreenivasa Iyengar suggested that the length of the mould board may be reduced. He was in favour of a reduction in the total weight of the plough to bring it down to about the same weight as the Kolar Mission.

The President explained that it would be quite possible to reduce weight to about 55 lbs. He had heard from an English firm that a plough of that weight could be made for about Rs. 28.

As regards the difficulty experienced in ploughing grass land Mr. W. Davison stated that the Hebbal plough worked better on grass land than did the Kolar Mission plough. Some fifteen acres had been ploughed and the bar had worn out a foot. The share and the wing had also become dull to work. The soil was dry laterite gravel. Mr. A. K. Yegnanarayana Iyer said he had noticed in a number of ploughs while at work that the nose of the share was too thin with the result that the edge got turned up after the plough had done some work and widened the slit between the bar and the share. He suggested that more metal was necessary at the nose of the share but it should not be so thick as in the case of the Syracuse plough.

Other members also spoke and it was generally agreed that the plough is a very useful one and satisfies a real need.

Mr. H. Sreenivasa Rao suggested importing only the metallic parts of the plough, the wooden parts being prepared here. For such a purpose he suggested either *matti (Terminalia tomentosa)* or some other more fibrous wood should be used.

In reply to the various suggestions made by members as regards local or Indian manufacture of the plough, the President narrated the history of the affair, and incidently mentioned that ploughs were being sent to the Department by well-known manufacturing companies for trial and for furnishing opinion on their work. It was announced that the Hebbal plough would be tried at the Farm for the benefit of members on Saturday provided the weather permitted.

Friday, 10th November, 1922.—Second Day.

Members visited the laboratories of the Department of Agriculture in the morning and evinced great interest in the pot-culture and potato breeding experiments which are being conducted. In the Entomological laboratories, they saw live specimens of a few insects at their work of destruction and expressed a surprise that some of the insects with which they were acquainted and which they used to think as being harmless, caused actually the loss they were sustaining. It was felt that special arrangements should have been made to show them the various specimens and explain to them the damages wrought by insects and methods of control recommended by the Department. In the Chemical laboratory too, the members were anxious to see some soil analyses or some such thing being done instead of their being "taken round". It might be that they would not have understood much of the details of an analysis but the demonstration of a soil being subjected to various scientific tests before an opinion is given by the Department is sure to create

an amount of confidence in the Department which is hard to estimate. It was also generally felt that more time should have been provided for study at the laboratories and it was only with difficulty that members could be persuaded to retire for dinner so as to be ready at the meeting at 12 noon in time.

The meeting commenced at the Daly Hall at 12-25 P.M. with Dr. Coleman in the Chair.

It was decided that each of the four subjects remaining to be discussed be allotted half an hour so as to get through the heavy programme.

SUGARCANE MANURING.

Mr. N. Krishna Iyengar, B.A., Inamdar of Ooragahally, opened a discussion on Sugar-cane Manuring. His speech is published elsewhere in this number.

Mr. Gowda Sivappa had brought all the way from Davangere average specimens of varieties of cane grown with and without ammonium sulphate. The differences were striking. Other members also spoke about the usefulness of ammonium sulphate as a renovating manure.

IMPROVEMENT OF SHEEP.

Mr. W. Davison, B.S.A., Live-Stock Expert in Mysore, then opened a discussion on the Improvement of Sheep. His speech is published elsewhere in this issue.

Mr. K. H. Ramiah referring to the "dipping" of sheep enquired whether the cost of dipping would be within the reach of the ordinary sheep breeder. Mr. Davison replied that the cost per sheep would be a fraction of an anna.

Mr. S. Hampiah pleaded for Government encouragement (financial) to the Sheep Breeders' Association formed at Kolar.

Mr. S. Venkataswamy Gowda urged that the disease from which sheep are commonly suffering should be properly studied and a remedy found for it.

Mr. A. K. Yegnanarayana Iyer enquired if the disease was peculiar to imported or local sheep. Mr. Venkataswamy Gowda replied that the disease was common to both. The President explained that the disease was probably bacterial in nature and new to Science and it was intended to take it up for investigation in the near future. Mr. M. S. Lingegowda spoke highly of the cross-bred rams he had purchased from the Dapartment.

Selected Varieties of Seeds.

The next subject on the agenda was "Improved varieties of ragi, ground-nut, sugar-cane and other seeds." Mr. S. Lakshman Reddy who should have opened the discussion having suddenly taken ill sent in a letter describing the experimental work he had done during the past four years. He had been testing a number of sugarcane varieties. H. M. 544 yielded him at the rate of 405 mds. to the acre, H. M. 310 gave at 343 mds. to the acre and H. M. 312 at 285 mds. to the acre. This was the result of varietal test only. The average of the locality for sugarcane was 250 to 300 mds. of jaggery per acre. But as the result of better spacing, manuring and varieties he and his neighbours were obtaining from 300 to 550 mds. of jaggery per acre. He had also found out a ragi suitable to his locality as the result of field tests conducted under the supervision of the Agricultural Department.

Mr. N. Krishna Iyengar gave his experiences of H. M. 544 sugarcane. It had given him 37 tons of cane per acre. It required less water, contained 18 to 19 per cent sugar, made good jaggery, grew erect and did not require wrapping. One of its bad qualities was that it produced too many shoots, many of which do not form cane. Of the other varieties of cane Nos. 303 and 310 had more fibre and less juice, the latter made poor growth. He was trying these and other varieties. The question with him was whether H. M. 544 and other canes being got from seed, would not deteriorate after some years. Mr. T. S. Subba Rao had applied 80 mds. of ground-nut oil-cake and 3 mds. of ammonium sulphate per acre. H.M. 544 had formed canes 12 feet long, the local side by side having formed only 8 feet length of cane.

Mr. S. Hampiah read his report on ragi trials. The President pronounced the report as exceedingly interesting, so well and carefully written that one might mistake it for a page of the Botanist's report. Even in advanced Canada he had not known a report of such detail having been sent by a farmer. He congratulated Mr. Hampiah on his very able report. Mr. Mastan Baig spoke about his castor varietal tests. While the local variety which had been sown early died out later due to drought, the new variety had formed heads a foot long.

Improvement of Sericulture.

Mr. N. Rama Rao, B.A., B.L., Superintendent of Sericulture, then opened a discussion on the Improvement of Sericulture, dividing the subject into three parts, *viz.*,

1. Improvement of the Silk-worm,
2. Improved Reeling, and
3. Sericultural Co-operation.

His speech is published *in extenso* elsewhere in this issue.

To an enquiry whether mulberry could be manured with oil-cake, Mr. Rama Rao replied in the affirmative and said he had absolutely no doubts about it.

Mr. Gowda Sivappa stated that if the climate, etc., of Davangere were suitable he would take up sericulture there.

Speaking at the close of the business meeting, the President complimented the members on the high standard and definiteness of the discussions which characterized the entire proceedings.

A short account of the Field-Day on the Hebbal Farm on the 11th November 1922, with photographs to illustrate will be published in our next number. [N. V. S.]

TO IMPROVE AGRICULTURE
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The Mysore Agricultural and Experimental Union.

Programme of Experimental Work for 1923.

CIRCULAR.

The Department of Agriculture desires to arrange with members of the Union for the carrying out of the following experiments during the coming season :—

1.—Experiments with Implements.

Trial of the Hebbal plough in comparison with any other type of improved plough. The Hebbal plough will be supplied free of charges to intending experimenters on the understanding that—

(*a*) It shall be used through one ploughing season and shall be used for ploughing not less than 5 acres of land, and

(*b*) It shall be returned to the Department at the end of the ploughing season with a report as to its working in the prescribed form.

(*c*) Carriage charges will be borne by the Department to and from.

Note.—Members who have already been supplied with a plough and who wish to continue the trial during the coming season also will be allowed to keep the plough for further trial, if they notify their wish to the Secretary. Ploughs returned by members who do not intend continuing the trial will be made available for trial to members who have not tried them.

2.—Experiments with Seeds.

Trial of selected strains of—

(*a*) Ragi—seed enough for 3 guntas each of two of the new varieties will be supplied.

(*b*) Ground-nut—seed enough for 3 guntas each of two new varieties will be supplied.

(*c*) Castor—seed enough for 3 guntas each of any two new varieties will be supplied.

(*d*) Cotton :

(1) Doddahatti—seed enough for 3 guntas will be supplied.

(2) Sannahatti—seed enough for 12 guntas each of two varieties will be supplied.

(*e*) Paddy—seed enough for 3 guntas each of any two varieties will be supplied.

(*f*) Sugarcane—seed enough for one gunta each of two new Hebbal seedling canes will be supplied.

Conditions of Supply of Seed.

1. The seed of each variety shall be sown in separate plots with check plots arranged as per instructions issued by the Department of Agriculture.
2. The results of the experiments shall be reported after harvest in the form which will be supplied.

3.—Experiments with Manures.

(1) Ammonium Sulphate and Nitrolim on Sugarcane. Between 12 and 20 guntas of land will be required. Ammonium Sulphate intended for experiment will be supplied at cost price; the value of manure per experiment may not exceed Rs. 25. A small quantity of Nitrolim is also available for trial as a manure for sugarcane.

(2) Manuring of paddy with Oil-cake and Super-phosphate—not less than 10 guntas of land will be required. The manure intended for experiment will be supplied at cost price; the value of manure per experiment may not exceed Rs. 5.

4.—Experiments on the Control of Insect Pests.

(*a*) Sugar-cane Borer as per instructions to be issued by the Senior Assistant Entomologist.

(*b*) Pests of Stored Pulses.

5.—Experiments on the Control of Fungus Diseases.

(*a*) Black Rot of Coffee. } Spraying material and sprayers will be supplied by the Department.
(*b*) Die-back of Coffee. } The labour to be supplied by the members.

6.—Experiments on Fodder Conservation.

Use of Sunflower for ensilage—Seed for one acre will be supplied free of charge.

7.—Sericultural Experiments.

Rearing—Experimental Rearing with seed of new races of Silkworms. 100 layings of eggs of selected new races will be issued free for each of 3 experimental rearings on condition that the rearing shall be conducted according to written instructions which will be issued by the Department, and that a report shall be furnished in the form which will be supplied. The cocoons must be sold to the Department who will give 10 per cent above market rates.

Reeling—Foot reeling machines will be lent for 3 months free of charge (conditions similar to those on which ploughs are lent) on condition that they shall be used for reeling at least 10 lbs. of silk

and that a report shall be furnished of results in the form prescribed by the Department. The experimenter may, with the consent of the Superintendent of Sericulture, sub-lend the machine, subject to the same condition. A demonstrator will be sent to instruct the experimenter in the use of the reeling machine.

8.—Maintenance of Farm Accounts.

Maintaining accounts on the model of the forms drawn up by the Union at the IV Annual Meeting. A copy of the model forms will be supplied on requisition.

Application from members intending to undertake the experiments should be made to the Secretary, The Mysore Agricultural and Experimental Union, Seshadri Road, Bangalore, in the following form, the particular experiment or experiments they desire to undertake being specified by being ticked off on this circular.

BANGALORE,
2nd December 1922.

LESLIE C. COLEMAN,
President,
The Mysore Agricultural and Experimental Union.

To
THE SECRETARY,
THE MYSORE AGRICULTURAL AND
EXPERIMENTAL UNION,
Seshadri Road, BANGALORE.

DEAR SIR,

I desire to undertake the experiments ticked off above during the coming season. Please arrange to supply the requirements.

Yours faithfully,

Date and Station.....

Signature and Address of the Member.

Circulars were sent to members separately and far in advance.

THE JOURNAL OF THE MYSORE AGRICULTURAL & EXPERIMENTAL UNION

Vol. IV.] [1922] [No. 1

PRINCIPAL CONTENTS.

Feeding Experiments with Ground-nut Oil-cake
By W. Davison, B.S.A., and B. Narasimha Iyengar, B.A., Ph D.
An Entomologist's Tour round the World
By K. Kunhi Kannan, M.A., Ph.D.
Anabe Disease of the Areca Palm
By S. Krishna Rao, *Agricultural Inspector.*

CONTENTS.

Page

Feeding Experiments with Ground-nut Oil-cake.—By W. Davison, B.S.A., and B. Narasimha Iyengar, B.A., Ph.D. .. .. 1— 9

An Entomologist's Tour round the World.—By K. Kunhi Kannan, M.A., Ph.D. .. .. .. 10—15

Anabe Disease of the Areca Palm (Ganoderma lucida).—By S. Krishna Rao, Agricultural Inspector .. .. .. 15—18

Notes on the more Important Insect Pests of Crops in the Mysore State.—By T. V. Subramania Iyer, Assistant Entomologist .. .. 18—24

Prevention is Better than Cure—a Letter to a Stock-Owner.—By S. D. Achar, G.B. V.C., Veterinary Inspector .. 24—27

Spraying for Koleroga 27

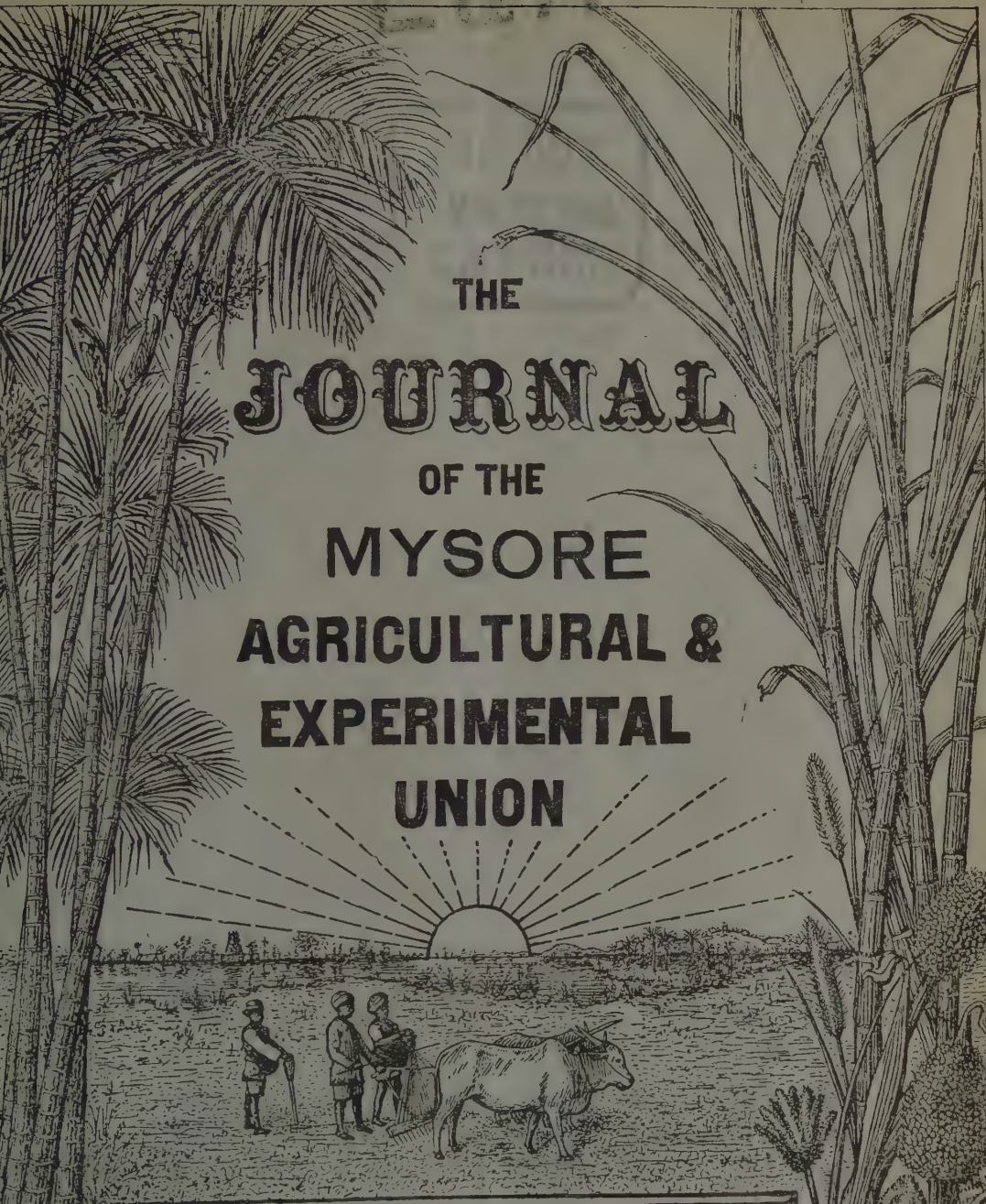
Notes and Comments.—

The Indian Science Congress—Ammonium Sulphate—The Japanese Foot or Pedal Reeling Machine—Silk-worms do thrive on Mulberry leaves from plants manured with Oil-cake—Another Superstition—Changing Silk-worms to a Fresh Bed—Quality *versus* Quantity in Live-stock—A Real form of Retrenchment.

Our Query Column 33

Selections.—

The Scrub Bull—Yield of Sisal Fibre in Jamaica—Milk Production of Young Cows compared with that of Mature Cows—How to select Desirable Ears of Corn for Seed purposes—India's Awakening—Rust or Leaf Disease—Striga as a Root Parasite of Sugarcane—Drainage and its relation to Crop Production—The Cultivation of Sugarcane in Java, as recorded by the Indian Sugar Committee—Science and Crop Production.



THE JOURNAL OF THE MYSORE AGRICULTURAL & EXPERIMENTAL UNION

Vol. IV.] 1922 [No. 2

PRINCIPAL CONTENTS.

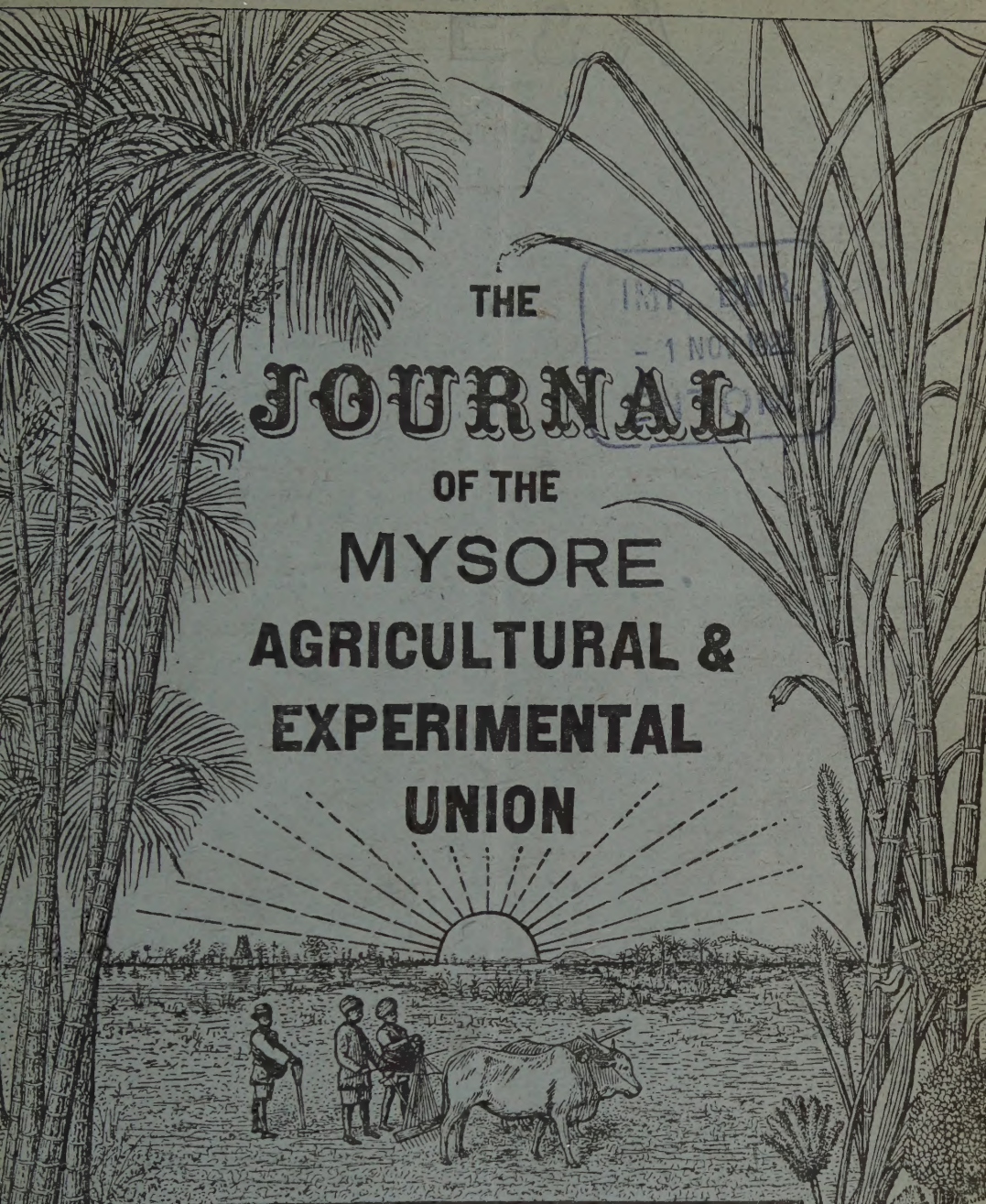
Agricultural Education—
By Gundappa S. Kurpad, B.A., *Vice-Principal, Hebbal Agricultural School.*

The Manufacture of Ensilage—
By W. Davison, B.S.A., *Live-stock Expert.*

The Lime-tree Borer—
By B. Krishna Murthi, B.Sc., *Assistant Entomologist.*

CONTENTS.

	Page
Agricultural Education.—By Gundappa S. Kurpad, B.A., Vice-Principal, Hebbal Agricultural School ..	57—61
The Manufacture of Ensilage.—By W. Davison, B.S.A., Live-stock Expert in Mysore	61—68
The Lime-Tree Borer.—By B. Krishna Murthi, B.Sc., Assistant Entomologist	69—73
Sulphate of Ammonia as a manure for Sugarcane.—By B. Narasimha Iyengar, B.A., Ph.D., Agricultural Chemist	73—76
Notes on the more Important Insect Pests of Crops in the Mysore State.—By T. V. Subramania Iyer, Assistant Entomologist	77—81
A note on Castration.—By B. V. Venkatachari, G.M.V.C., Veterinary Inspector	81—83
Trial of Groundnut varieties at Kappalmadagu.—By K. Nagegowda, Patel	83—84
NOTES AND COMMENTS.— Agricultural Credit in Germany.—Agriculture Without Turning the Soil—Manurial Experiments in the former German Colonies in East Africa — Proceedings of the Board of Agriculture in India held in February, 1922 — Colour in Cattle — Ensilage ..	85—88
Our Query Column.— Frequency of Milking Cows	89—90
CORRESPONDENCE.— Letter on the Flowering of Sugarcane	90—91
SELECTIONS :— Longevity in Seeds — White Cattle Superstitions — Substitution of Vegetable Oil for Paraffin as Fuel for Motors and Tractors in the Colonies — Avoiding Faulty Plough Construction — The Dwarf Cocoanut — The Manuring of Coffee Estates — Cashewnut —Science and Crop Production	92—112



THE JOURNAL OF THE MYSORE AGRICULTURAL & EXPERIMENTAL UNION

Vol. IV.] 1922 [No. 3

PRINCIPAL CONTENTS.

How can we increase our Cultivated Area ?—
By Leslie C. Coleman, M.A., Ph.D.
The Spraying Work against Areca Koleroga—
By M. J. Narasimhan, B.A.
Availability of Phosphates in Red Soils—
By B. Narasimha Iyengar, B.A., Ph.D

CONTENTS.

	Page
How can we increase our Cultivated Area? By Leslie C. Coleman, M.A., Ph.D., Director of Agriculture in Mysore	113—116
The Spraying Work against Areca Koleroga.—By M. J. Narasimhan, B.A., Senior Assistant Mycologist	117—122
Availability of Phosphates in Red Soils.—By B. Narasimha Iyengar, B.A., Ph.D., Agricultural Chemist	122—127
A visit to the Imperial Silkworm Rearing Rooms in Tokyo.—By H. S. Govinda Rao, B.A., Sericultural Inspector on deputation	128—131
Notes on the more important Insect Pests of Crops in the Mysore State.—By T. V. Subramania Iyer, Assistant Entomologist	131—135
Potato Cultivation at Masti, Malur Taluk.—By M. Srinivasa Iyengar, Landlord	135—136
Results of Plough Trials.—By Gundappa S. Kurpad, B.A., Vice-Principal, Mysore Agricultural School	137
CORRESPONDENCE.—	
Co-operative cultivation of Gomal in a village in Nasik, District Bombay	138
NOTES AND COMMENTS.—	
Types of Mysore Cattle, I—The effect of Feed on the Composition of Milk—Ammonium Sulphate as a Weed Killer—Use for Casein—Sugarcane Borer—Our Annual Meeting	139—142
SELECTIONS.—	
The Cultivation of Tobacco Plants—The Clean Milk Can	136
Every Farmer should be an Experimenter	138
The United States' Outlay on Progressive Agriculture—The Pure-bred Dairy Sire—The Rest Cure for Soils—Pepper Cultivation in Cambodia—Sunflowers for Silage—Value of Farmyard Manure in Crop Production—Co-operative Consolidation of Holdings in the Punjab—Notes on Fencing	143—169
ANNOUNCEMENT.—	
Sale of Bull Calves at Hebbal during the Annual Meeting of the Union	169
ADVERTISEMENTS.	

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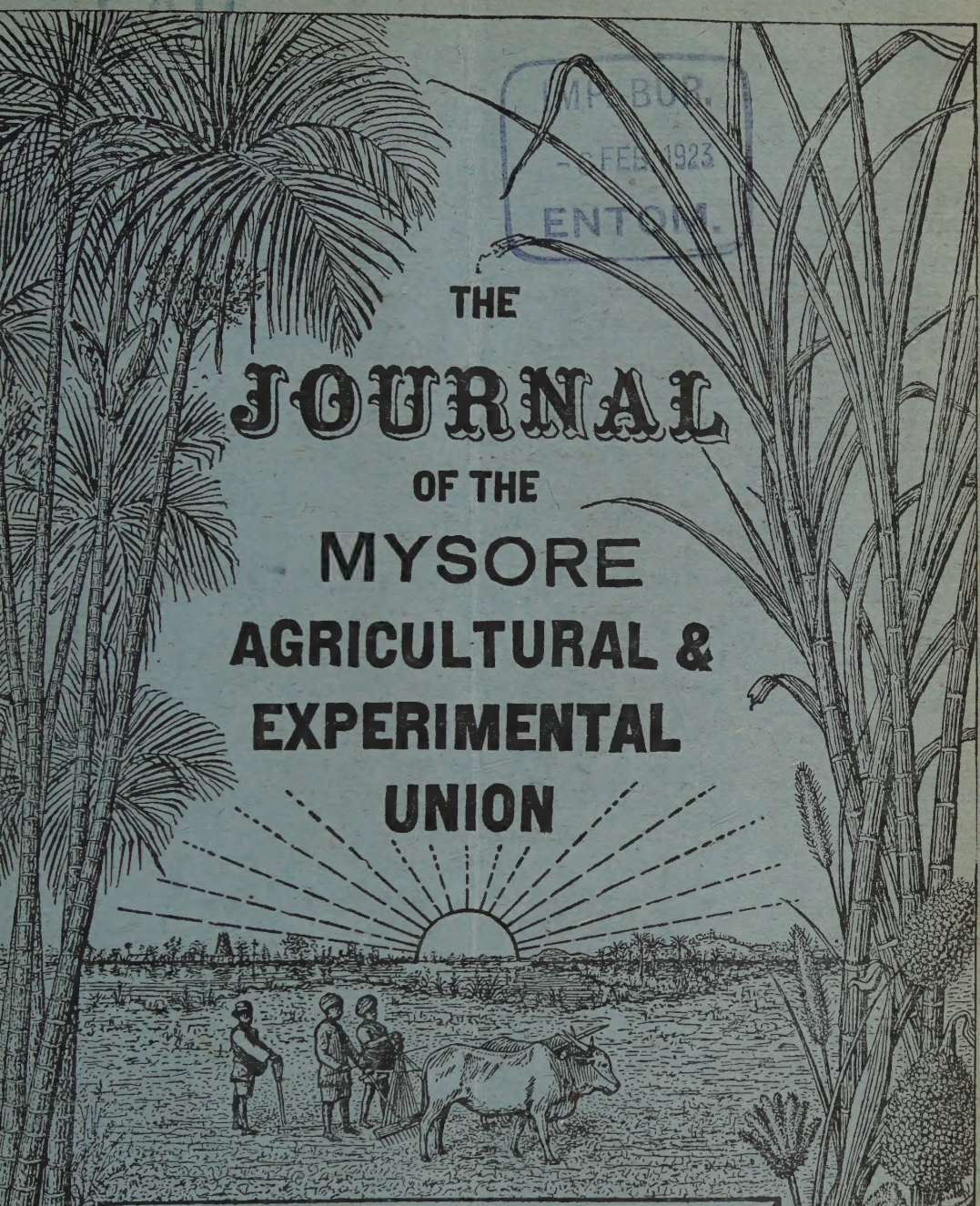
THE JOURNAL OF THE MYSORE AGRICULTURAL & EXPERIMENTAL UNION



Vol. IV.] 1922 [No. 4

PRINCIPAL CONTENTS.

The Fifth Annual Meeting—

Manuring the Sugarcane—
By N. Krishna Iyengar, B.A., *Inamdar, Uragahally Estate.*

Agriculture as a Vocation—
By Gundappa S. Kurpad, B.A.,
Vice-Principal, Mysore Agricultural School.

CONTENTS.

	Page
The Fifth Annual Meeting—Welcome Speech by the President of the Union	171—177
Chairman's Speech	178—186
The Hebbal Plough—By H. Srinivasa Rao, Retired Deputy Conservator of Forests	187—188
Manuring the Sugarcane—By N. Krishna Iyengar, B.A., Inamdar, Uragahally Estate	188—190
Improvement of Sheep—By W. Davison, B.S.A., Live Stock Expert in Mysore	190—193
Some Sericultural Problems—By N. Rama Rao, B.A., B.L., Superintendent of Sericulture in Mysore	193—195
Sale of Implements, Manures and Seeds through Co-operative Societies—By A. K. Yegnanarayana Aiyar, M.A., N.D.D., etc., Deputy Director of Agriculture in Mysore	196—201
Agriculture as a Vocation—By Gundappa S. Kurpad, B.A., Vice-Principal, Mysore Agricultural School	202—208
The Manifold Virtues of Milk	208
NOTES AND COMMENTS.— Our Annual Meeting—Agriculture as a Vocation—The Kolar District Sheep Breeders' Association—The most Expensive Bull in the World—Fifteen Tons of Sugar per acre—Bounty on Home-grown Sugar in Great Britain	209—214
SELECTIONS.— Increased Returns from Intensive Cultivation, 118 Tons of Cane from one Acre—Advantages of Deep Ploughing —Ensilage from Cane Tops	215—218
Proceedings of the Fifth Annual Meeting of the Union—By the Secretary	219—229
Programme of Experimental Work for 1923	230—232
Advertisements.	